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William Ritteman **Indiana Employment Growth, 1960-1981: An Examination of the Industrial Mix Hypothesis**

Thomas W. Hertel and Lance McKinzie **Input-Output Analysis for the Indiana Economy**

In this issue . . .

How does the economy of Indiana work? What is it doing now? How did it get here? Where is it going? Those are the questions asked by Indiana economists and citizens alike and the questions most frequently discussed in these pages.

For this issue we have two structured analyses of the state's economic functioning. The performance of Indiana relative to the nation is the focus of the article by Bill Ritteman of the Indiana State Department of Commerce. He tests the assumptions of the industrial mix hypothesis against available data on recessionary and expansionary periods in Indiana and the U.S.

Thomas W. Hertel and Lance McKinzie of Purdue University offer an input-output analysis of the state's economy, arguing that adding value by increasing the share of processing done in the state could increase employment and income. By studying the interrelationships between sectors of the State's economy, they develop an impact analysis which can be used by policy makers.

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Indiana Employment Growth, 1960-1981: An Examination of the Industrial Mix Hypothesis

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Recent recessionary problems in the Midwest have once again focused attention on the sensitivity of Indiana and neighboring states to swings in the national business cycle and on the fact that Indiana experiences greater swings in employment and income through these cycles than does the nation as a whole. The predominant explanation for this sensitivity—industrial mix—is largely taken for granted. Though Indiana's heavy employment concentration in sensitive industries such as auto parts and steel production presents a plausible explanation for the State's cyclical sensitivity, available research based on recent data is lacking.

It is reasonable to assume that industrial mix is a factor in determining the magnitude of Indiana business cycles, but it would be useful to understand the degree of its influence. In this article, we quantify the role that industrial mix played in determining Indiana's cyclical employment fluctuations since 1960. In doing so, we will attempt to test what may be termed the "industrial mix hypothesis," an explanation for the procyclical tendency of Indiana employment levels that occurs in both recessions and expansions.

Indiana employment usually increases or decreases with the national economy, though at a more rapid rate. According to the industrial mix hypothesis, this tendency results from a disproportionately high concentration of employment in cyclically sensitive industries that are most heavily affected by sharp changes in consumer spending during upturns and downturns. Our study is preceded by a description of the business cycles which have occurred since 1960.

Efforts to identify and describe state cyclical behavior have established Indiana's cyclical sensitivity. An earlier study completed by G.H. Borts in 1960 attempted to test the industrial mix hypothesis by imposing hypothetical employment weights on state data. Using this method to equate state and national industry composition, Borts concluded that the severity of state cyclicality was not solely determined by industrial composition. Further, Borts' method of measuring cyclical amplitude revealed that Indiana was the fifth most sensitive state among 33 studied during the period from 1914-1951.[1]

There are some studies, such as the above, which attempt to explore underlying causes, but research of a descriptive nature is more readily available. H. Friedenberg and R. Bretzfelder, for example, measured the "cyclical swing" in state nonfarm payrolls by calculating the difference between mean quarterly percent changes during expansions and recessionary periods. These authors discovered that Indiana sustained greater swings than all other states except Michigan during the 1948-1973 period of study. Further, during these postwar years, Indiana's cyclical swing stood at 13.6% in contrast with a U.S. swing of 7.8%.[2]

Indiana Employment Cycles, 1960-1981

To simplify our selection of peaks and troughs for defining contractions and expansions in each cycle, we have elected to use dates set forth by the National Bureau of Economic Research (NBER). Although the timing and duration of Indiana expansions and contractions usually do not exactly correspond to those experienced by the U.S., this approach eliminates the subjectivity sometimes associated with selection of dates at the state level. The dates of NBER designated contractions and expansions since 1960 are listed below.

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[1] G.H. Borts, "Regional Cycles of Manufacturing Employment in the United States, 1914-1953," *Journal of the American Statistical Association*, 1969: 151-211.

[2] H. Friedenberg, and R. Bretzfelder, "Sensitivity of Regional and State Nonfarm Wages and Salaries to National Business Cycles, 1948-79," U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, May 1980: 15-27.

Table 1

Dates of Recessions and Expansions Designated by the National Bureau of Economic Research

Type of Period	*Dates of Employment Period*
Contraction	April 1960-February 1961
Expansion	February 1961-December 1969
Contraction	December 1969-November 1970
Expansion	November 1970-November 1973
Contraction	November 1973-March 1975
Expansion	March 1975-January 1980
Contraction	January 1980-July 1980
Expansion	July 1980-July 1981

During the period from April 1960 through July 1981, Indiana experienced large employment swings. Table 2 provides historical estimates of Indiana employment with percent changes under the "Actual Indiana Employment" column. Indiana and U.S. employment declines during recessionary periods averaged roughly 6% and 2.3%, respectively, from 1960 to 1981. In each of the four recessionary periods, the Indiana employment decline was several percentage points greater than the decline sustained at the U.S. level. During the four periods of decline, Indiana employment fell by 4.6%, 5.6%, 7.4%, and roughly 6.0%, respectively. National employment declined by only 2.6%, 2.0%, 3.1%, and 1.6% during the corresponding periods. Viewing each of the Indiana downturns in succession, a mild pattern of increasing declines is evident from the first through the third recessionary period where employment dropped 7.4%. In the final period of decline, Indiana employment fell by a slightly smaller percentage. National employment evidenced no clear pattern of increasing or decreasing employment declines during these periods; the first and third employment declines were higher than those experienced in the second and fourth periods of employment loss.

To compare the severity of Indiana's employment decline during recessions with the decline at the national level during the corresponding period, an index has been developed. (See the "Actual Indiana Employment Sensitivity" column found in Table 3.) The employment gain or loss in each period, for both Indiana and the U.S., is expressed as a percentage of the initial month's employment level in the given period. Indiana's percent change in employment during each period was divided by the corresponding U.S. percent change to obtain an index that expresses the relationship of Indiana's and the nation's employment fluctuations. An index number around 1, for example, would indicate that Indiana and the nation experienced roughly the same rate of employment change during a given period. Index numbers above 1 indicate periods where Indiana's rate of employment change exceeded that experienced at the national level. An index number below 1 indicates a period where Indiana's rate of employment change was below the nation's.

Table 2

Actual and Simulated Total Indiana Employment and Total U.S. Employment at Inflection Points With Percent Changes[1]

Period	*Actual Indiana Employment*	*Percent Change*	*Adjusted Indiana Employment*[2]	*Percent Change*	*Actual U.S. Employment*	*Percent Change*
4/60–2/61	1,198.388	–4.63	1,219.472	–2.95	43,583	–2.63
2/61–12/69	1,596.110	33.19	1,598.836	33.42	57,365	31.62
12/69–11/70	1,506.465	–5.62	1,538.561	–3.61	56,231	–1.98
11/70–11/73	1,741.521	15.60	1,727.582	14.68	62,599	11.32
11/73–3/75	1,612.282	–7.42	1,659.531	–4.71	60,681	–3.06
3/75–1/80	1,850.149	14.75	1,883.117	16.80	73,516	21.15
1/80–7/80	1,738.224	–6.05	1,756.392	–5.07	72,304	–1.65
7/80–7/81	1,787.823	2.85	1,775.159	2.12	74,325	2.79

1. Monthly estimates in thousands at end of contraction and expansionary periods, April 1960-July 1981. Percent changes are from initial to terminal employment levels expressed as a percentage of initial employment level in each period.

2. Indiana employment adjusted for the U.S. industrial mix in each period.

Table 3

Indiana Relative to U.S., Computed for Actual and Adjusted Indiana Employment Values[1]

Period	*Actual Indiana Employment Sensitivity vs. U.S. Employment Sensitivity*	*Adjusted Indiana Employment Sensitivity vs. U.S. Employment Sensitivity*
4/60-2/61	1.76	1.12
2/61-12/69	1.05	1.06
12/69-11/70	2.84	1.82
11/70-11/73	1.38	1.30
11/73-3/75	2.42	1.54
3/75-1/80	0.70	0.79
1/80-7/80	3.67	3.07
7/80-7/81	1.02	0.76

1. Index computed by dividing U.S. measure of cyclical sensitivity into Indiana value for each contraction and expansionary period. Indices above one signify Indiana employment sensitivity in excess of U.S. employment sensitivity. Index numbers below one indicate U.S. employment sensitivity in excess of Indiana estimate.

The index numbers for the four recessions are listed below.

Recession	*Index Number*
April 1960-February 1961	1.76
December 1969-November 1970	2.84
November 1973-March 1975	2.42
January 1980-July 1980	3.67

For each of the recessions, the index number is greater than 1, indicating a more severe rate of employment decline in Indiana than for the nation. The relationship is particularly clear for the most recent recession. Here, the January 1980 to July 1980 index reveals that Indiana sustained roughly three and one-half times the decline experienced by the nation as a whole.

The expansions experienced since 1960 present a clear contrast with the recssions. Unlike the periods of decline, Indiana and U.S. growth rates were relatively close in each of the four upturns studied. During these periods, Indiana employment increased at an average rate of 16.6%, while U.S. employment gains averaged roughly 16.7%. During the four growth periods between 1960 and 1981, Indiana employment increased by 33.2%, 15.6%, 14.7%, and 2.8%, respectively. National gains stood at 31.6%, 11.3%, 21.2%, and 2.8% during the same periods. Indiana employment increases, when viewed successively, present a more pronounced pattern than do the periods of Indiana employment loss. The four upturns studied showed a fairly steady pattern of decreasing intensity. The second period of Indiana employment growth was less than one-half that of the first upturn. Likewise, the final two periods of growth were even smaller, and the last employment increase was just 2.8%. National employment gains, much like national employment losses, failed to show any clear pattern of increasing or decreasing intensity over time. National employment growth in the second period of increase was only about one-third the level experienced during the earliest such period. A substantial increase appeared during the third growth period, and the final period studied showed only very modest employment gains.

The index computations for the expansions are found below.

Expansion	*Index Number*
February 1961-December 1969	1.05
November 1970-November 1973	1.38
March 1975-January 1980	0.70
July 1980-July 1981	1.02

The index numbers indicate that the rate of employment growth during the March 1975-January 1980 expansion was less in Indiana than for the nation. Only during the November 1970-November 1973 expansion did the rate of employment growth in Indiana significantly exceed that of the nation.

Since recessions and expansions of greater duration are likely to provide greater employment swings, the preceding percent changes do not adequately reflect the rate of change that occurred. The compound annual rate of change for each period, found in **Table 4**, will thus add to our understanding. Indiana declines expressed as compound annual rates were substantially greater than rates of decline experienced at the national level. Indiana employment declined at an annual rate of 5.5%, 6.1%, 5.6%, and 11.7%, respectively, during the four recessionary periods. Comparable U.S. declines stood at 3.2%, 2.1%, 2.3%, and 3.3%. While Indiana rates of change were greater than U.S. estimates, they also evidenced less stability than did national figures, particularly in the final period. The 11.7% rate of decline that was sustained in the State's last recessionary period stood at nearly twice the next highest estimate.

During three of the four expansionary periods, Indiana compound annual rates of change exceeded those at the U.S. level. Indiana rates stood at 3.3%, 4.9%, 2.9%, and 2.9%, respectively. National employment increased at rates of 3.2%, 3.6%, 4.1%, and 2.8% during the corresponding periods. The period from March 1975 to January 1980 contrasts with other expansions since the U.S. annual rate of change stood somewhat above the Indiana estimate for the first time since 1960. The same relationship is apparent when simple percent changes during this expansion are compared. The U.S. employment gain of 21.1% was significantly higher than the Indiana increase of 14.7%.

The final expansion is an anomaly since it represents the only Indiana expansion that did not provide a return to the pre-recession employment level. During this period, state employment peaked at roughly 1.79 million, falling short of the 1.85 million employment level experienced in the previous upturn. In contrast, all U.S. expansions provided peak employment estimates that exceeded levels attained in previous expansions.

Although one popular notion suggests that Indiana's long-run employment growth is comparable to the nation's despite greater losses in recessions, the data suggest that this is not true. The overall net employment change from April 1960 to July 1981 provides insight into long-run growth. Though not strictly an indication of trend, this percent change will indicate the relative performance of Indiana's economy and the national economy during the total period of study. These data reveal that Indiana experienced a 49.2% net employment increase, while the comparable national estimate stood at just over 70%. Indiana is clearly more procyclical (sensitive to employment fluctuations in the direction of the national economy) during downturns than during upturns. During the period of study, Indiana employment gains during upturns closely paralleled those enjoyed at the U.S. level, though much greater employment increases would have been needed to make up losses sustained since 1960. This combination of employment gains and losses led to Indiana's relatively poor employment performance; the State's twenty-year net increase fell more than 20% short of the national economy's twenty-year increase. This observation is of particular significance since it conflicts with one popular notion of Indiana's cyclical sensitivity. Indiana employment gains during these periods of prosperity did not, in fact, offset losses to an extent that would afford Indiana an overall net employment change comparable to that experienced at the national level.

Methodology

To determine the extent to which Indiana's industrial mix has contributed to the severity of employment swings since 1960, we wish to modify the State's industrial composition, as expressed by its employment distribution, to correspond to the nation's industrial mix in each recession and expansion that occurred since 1960. By doing so, we examine Indiana employment growth in the absence of the procyclical influence thought to result from our concentration of firms in cyclically sensitive industries such as steel and auto manufacturing.

The X-11 seasonal adjustment technique was applied to all raw data to eliminate employment fluctuations resulting from production in seasonally sensitive industries. Though no seasonal adjustment method is completely free of error, the X-11 technique is the most widely accepted method for obtaining deseasonalized estimates. To simplify data collection, the tobacco and leather manufacturing industries were deleted, while the remaining Indiana industries form the basis of aggregate employment at both the state and national levels.

Since our study examines the influence of cyclical variation on employment only, employment distribution is used to express industrial mix. We assigned the nation's industrial mix to Indiana employment data by applying U.S. weights (the percentage of total U.S. employment in each industry) to re-allocate initial Indiana employment figures in each period at the industry level. Following this phase, actual Indiana industry growth rates in each period were applied to each new Indiana industry employment estimate to obtain estimates of total Indiana employment at the end of each recessionary and expansionary period that might have occurred if Indiana's economy had possessed the same mix of industries as the nation. We call this the "industry adjusted" or "adjusted" employment level. This technique enabled us to eliminate the differential influence of Indiana's unique industrial mix on employment declines and expansions that occurred in each cycle since 1960.

Estimates of the percentage of total Indiana employment losses that are explained by our adjustment for industrial mix were calculated by first estimating the end-of-period employment level that Indiana might have sustained if the State's employment growth had been exactly the same as the nation's in each recession (U.S. percent declines in each period were applied to actual Indiana employment estimates at the start of each period). The resultant figures will hereafter be referred to as "simulated" employment levels. By subtracting actual end-of-period Indiana employment levels from these estimates in corresponding recessions, we obtain the amount of Indiana employment declines in excess of declines sustained at the national level. We may then express the employment increase that resulted from our adjustment for industrial mix (adjusted Indiana employment minus actual Indiana employment) as a percentage of this figure to estimate the percentage of Indiana employment declines, beyond those experienced at the national level, attributable to industrial mix.

Table 4

Actual and Simulated Total Indiana Employment and Total U.S. Employment, With Compound Annual Rates of Change[1] and With Percentage of Indiana Cyclical Sensitivity Attributable to the Industrial Mix Hypothesis

Period	*Actual Indiana Employment*	*Percent Annual Change*	*Adjusted Indiana Employment*[2]	*Percent Annual Change*	*Actual U.S. Employment*	*Percent Annual Change*	*Indiana Employment Simulated for U.S. Growth Rates*[3]	*Percentage Attributable to Industrial Mix*[4]
4/60-2/61	1,198.388	−5.55	1,219.472	−3.54	43,583	−3.16	1,223.503	83.95
2/61-12/69	1,596.110	3.30	1,598.836	3.32	57,365	3.16	1,557.318	0
12/69-11/70	1,506.465	−6.11	1,538.561	−3.93	56,231	−2.15	1,564.507	55.30
11/70-11/73	1,741.521	4.95	1,727.582	4.67	62,599	3.64	1,676.997	21.60
11/73-3/75	1,612.282	−5.63	1,659.531	−3.56	60,681	−2.31	1,688.230	62.21
3/75-1/80	1,850.149	2.89	1,883.117	3.27	73,516	4.05	1,953.280	0
1/80-7/80	1,738.224	−11.73	1,756.392	−9.88	72,304	−3.27	1,819.622	22.32
7/80-7/81	1,787.823	2.85	1,775.159	2.12	74,325	2.79	1,786.720	0

1. Monthly estimates in thousands at end of contraction and expansionary periods, April 1960-July 1981. Percent changes are from initial to terminal employment levels expressed as a percentage of initial employment level in each period.

2. Indiana employment adjusted for the U.S. industrial mix in each period.

3. Indiana employment in thousands at end of periods calculated by assigning U.S. growth rates in each period to initial Indiana employment level in each period.

4. Percentages represent amount of Indiana cyclical variation in excess of U.S. cyclical variation.

A similar procedure is employed to quantify the influence of industrial mix during upturns. Here, the amount of employment gains in excess of U.S. gains is calculated by subtracting simulated end-of-period Indiana employment estimates from actual employment figures for each expansion. We may then divide the employment change that resulted from our adjustment for industrial mix (actual employment minus adjusted employment) by these estimates to calculate the percentage of Indiana employment gains, in excess of U.S. gains, that are attributable to Indiana's industrial mix. For any given period where Indiana employment patterns did not behave as anticipated by our industrial mix hypothesis, a zero was assigned to the column in Table 4 labeled "Percentage Attributable to Industrial Mix."

Although we were able to estimate Indiana employment that might have existed if our State's employment distribution had been the same as the nation's in each period since 1960, several caveats are in order. Most importantly, it is impossible to estimate precisely the magnitude of state employment changes, given the nation's employment distribution, since a different employment distribution might affect industry growth rates in some fashion that we cannot estimate. Since it is impossible to know how this assigned employment distribution would have affected individual growth rates in each Indiana industry, we assumed that growth rates would not be affected. Although we recognize that the assumption is not entirely realistic, it is the most probable assumption that can be readily implemented in our study.

A second error factor exists because Indiana industrial composition was modified to meet the U.S. distribution only at selected points in each recessionary and expansionary period. The modified employment distribution determined for each employment period was used throughout that period. The ideal approach would recalculate and assign the nation's employment distribution to Indiana in each month studied. However, such a method would entail an inordinate amount of data manipulation.

Finally, we observe that the simulated employment levels computed in this study do not constitute a time series. Each end-of-period industry-adjusted employment level is predicated only upon initial (actual) employment data for the same period. Therefore, each simulated employment period must be viewed in isolation, as if the hypothetical change in industrial mix had taken place at the beginning of that period. In other words, the July 1981 industry adjusted employment estimate is not intended to convey the results of a change in industrial mix that occurred twenty years earlier.

Findings

In each of the contractions since 1960, Indiana's actual end-of-period employment fell below the level simulated for the U.S. employment growth rate during the period. The following table indicates the employment shortfall for each of the contractions.

Contraction	*Actual Indiana End-of-Period Employment—Simulated Employment*
Apr 1960-Feb 1961	−25,115
Dec 1969-Nov 1970	−58,042
Nov 1973-March 1975	−75,948
Jan 1980-July 1980	−81,398

Indiana employment declines would have been dampened in each of the recessionary periods had the State possessed the same industrial mix as the U.S. Table 2 indicates that roughly 21,000 jobs might have been retained had it been possible to modify our State's economy in this manner during the first recession (April 1960-February 1961). Table 3 reveals that assigning the nation's industrial mix to the Indiana economy induces a decline in the index of cyclical sensitivity from 1.76 to 1.12, indicating that the severity of this recession might have been significantly dampened with our hypothetical change in industrial mix. This change is also manifested in the compound annual growth rates calculated to include the influence of the nation's industrial mix component, found in Table 4. A change from the −5.5% annual rate of decline in the actual data to −3.5% is observed when the Indiana economy is more closely tied to the nation's. However, the most striking finding is that 83.9% of Indiana's cyclical swing in excess of the nation's is explained by the industrial mix hypothesis. Table 4 reveals that this is the highest percentage of employment variation attributable to industrial mix evidenced in the four recessions studied.

Table 2 suggests that some 32,000 of the jobs lost during the recessionary period from December 1969 to November 1970 might have been retained had our State's industrial mix been similar to the nation's. This difference is reflected in the index of cyclical sensitivity, which declines from 2.84 to 1.82 when the nation's industrial mix is imposed at the state level. Table 4 also shows that the average annual employment loss during this recession might have been reduced by slightly more than 2% had it been possible to modify the State's industrial mix to correspond to that of the nation. The industrial mix component explains roughly 55.3% of Indiana's employment decline beyond that experienced by the nation as a whole during this recession. This also suggests that almost half of the State's decline beyond the nation's is attributable to greater net rates of decline within industries at the state level than in the same industries at the national level.

Some 47,000 Indiana jobs might have been retained during the November 1973 to March 1975 recession had we had the nation's industrial mix. A shift from 2.42 in the "actual" index of cyclical sensitivity to 1.54 in the "adjusted" index suggests that a substantial decline in Indiana's cyclical sensitivity might have occurred in our hypothetical scenario. Assigning the nation's employment distribution to the Indiana data induces a change in employment losses from −5.63% annually to −3.56% (see Table 4). Table 4 indicates that 62.2% of the State's employment variation in excess of that sustained at the national level can be explained by the industrial mix component. Of the four recessions studied, the period from November 1973 to March 1975 evidenced the second highest percentage of employment variation explained by the industrial mix hypothesis.

Some 18,000 jobs lost during the final recession studied (January 1980-July 1980) might have been retained if Indiana's industrial mix had been like the nation's. Our hypothetical change in Indiana's industrial composition also produced a moderate decline in the index of cyclical sensitivity. This decreased sensitivity to the national recession is also reflected in a drop in the annual rate of employment loss, from 11.7% to 9.9%. However,. of the four recessions studied, this period appears to provide the least support for our industrial mix hypothesis. Only 22.3% of Indiana's cyclical employment variation resulted from the State's industrial mix. This suggests that greater employment decline within industries at the state level relative to the employment decline in these same industries at the national level was primarily responsible for Indiana's overall employment decline relative to the nation's.

In reviewing the Indiana economy's behavior during the four recessions studied, we note that Indiana employment declines exceeded those experienced by the nation as a whole in each period. Our methodology suggests that employment losses would have been dampened significantly in each period had Indiana's distribution of employment among industries (industrial mix) been equivalent to the nation's. The percentage of Indiana employment shortfalls that can be explained by our industrial mix hypothesis varied substantially, from a maximum of 84% in the April 1960-February 1961 recession to the final period of decline where about 22% of Indiana's employment variation was directly attributable to this factor. The average percentage of employment variation beyond that experienced by the nation explained by the industrial mix component stood at 69.6% for the first two contractions, while the latter two recessions averaged just 42.3%. This suggests that the industrial mix hypothesis has lost some of its explanatory power, while that of the industry growth hypothesis has increased.

Indiana's behavior in the four expansions that have occurred since 1960 is more difficult to explain. In the first two expansions, Indiana's actual end-of-period employment exceeded the levels simulated for U.S. employment growth in each period. In the third expansion, Indiana's actual end-of-period employment was significantly below the simulated level, while in the most recent expansion, actual and simulated end-of-period employment were about equal. The following table illustrates the relationship of actual and simulated end-of-period employment in Indiana for the four expansions.

Expansion	*Actual Indiana End-of-Period Employment—Simulated Employment*
Feb 1961-Dec 1969	+18,792
Nov 1970-Nov 1973	+64,524
March 1975-Jan 1980	−103,131
July 1980-July 1981	+1,103

Since our procyclical hypothesis states that actual Indiana employment swings will be more pronounced than those experienced by the nation in both downturns and upturns, we would expect Indiana's actual end-of-period employment to exceed the simulated end-of-period level based on the overall U.S. growth rate. Furthermore, we would expect Indiana's industry-adjusted end-of-period employment to be lower than the actual end-of-period total. This would indicate that Indiana's industrial mix was favorable during expansions. Our expectations are substantiated for only one of the four expansions studied.

Some 2,726 additional jobs might have been gained in Indiana during the first expansion (February 1961-December 1969) had the State possessed the nation's industrial mix. This observation is contrary to our hypothesis, since we expected that industry adjustment of employment levels would dampen the Indiana expansion. This heightened expansion is reflected in the index of cyclical sensitivity which stood slightly higher when computed with the industry-adjusted Indiana employment level. Here, the index rose from 1.05 to 1.06. The compound annual growth rate increased by a similar amount, moving from 3.3% for actual Indiana data to 3.32% for industry-adjusted employment levels. Consistent with the notion that this expansion fails to support the industrial mix hypothesis, we note that none of Indiana's employment variation during this period was directly attributable to the industrial mix component. Indiana employment during the expansion apparently increased more rapidly than the nation's due to slightly higher rates of growth within individual industries at the state level.

The second expansion (November 1970-November 1973) appears to provide more support for the industrial mix hypothesis, as total Indiana employment decreased when adjusted for the nation's employment distribution. Nearly 14,000 fewer jobs would have been generated with the nation's industrial composition during the period from November 1970 to November 1973. This difference is evidenced in the somewhat lower index of cyclical sensitivity. An "adjusted" index of 1.3 compared with the "actual" index of 1.38 is found in Table 3. The compound annual growth rates found in Table 4 also evidence this difference, dropping from 4.95 to 4.67 when employment levels are adjusted for the nation's industrial mix. Nearly 22% of the excess in Indiana employment gains is explained by industrial mix. This suggests that Indiana's employment during this expansion apparently increased more rapidly than the nation's, due in large part to higher rates of growth within individual industries at the state level.

During the third expansion (March 1975-January 1980), Indiana's actual end-of-period employment was about 103,000 less than a simulated employment level based on the U.S. employment growth rate. Further, the period is an anomaly because Indiana's employment level adjusted for the nation's industrial mix stood nearly 33,000 higher than the actual end-of-period employment. The fact that Indiana's actual end-of-period employment level was below both the simulated level based on U.S. employment growth rates and the employment level based on the nation's industrial mix is counter to our expectations. This situation suggests that during this expansion, Indiana's employment growth was hampered by both its industrial mix, which was not conducive to growth, and by employment growth rates within industries which were lower at the state than the national level.

The final expansion (July 1980-July 1981) is unique in that it represents the only upturn which did not induce a return to pre-recession employment levels in Indiana. The previous expansion saw State employment rise to 1.85 million but, following the 1980 recession, Indiana employment returned to only 1.79 million. However, despite the modest nature of employment gains experienced during this expansion, roughly 12,600 fewer jobs might have returned had Indiana possessed the nation's industrial mix. This gap represents a difference of one-fourth of one point in the index of cyclical sensitivity and .73% in the compound annual rate of change. The observation that the State's industrial mix adjusted employment would have been below the actual end-of-period level suggests that Indiana's industrial mix was favorable during the last expansion. The fact that Indiana's actual end-of-period employment was about equal to the simulated level based on the overall U.S. growth rate suggests that the favorable industrial mix was offset by unfavorable industry growth rates in Indiana (see Table 4).

In reviewing Indiana's behavior during the four expansions that occurred since 1960, we can state several major findings. During the first upturn, Indiana's employment growth exceeded the nation's. Since none of Indiana's employment variation during this period was directly attributable to the industrial mix component, this growth was probably due to better industry performance in Indiana.

Indiana's employment growth during the second expansion fit our industrial mix hypothesis more closely than it did during other growth periods. Not only did Indiana employment gains exceed national gains by a considerable margin but, in addition, Indiana's industry-adjusted end-of-period employment level dampened Indiana growth, placing it closer to the U.S. growth pattern. Despite a much higher level of employment variation attributable to the industrial mix component, differing state and national industry growth rates were probably the most influential factors in determining Indiana's performance during this period.

Indiana's relatively poor employment growth during the third expansion would have been improved with an industrial composition more nearly tied to the nation's. However, the fact that a majority of the Indiana-U.S. employment growth differential still remained after our adjustment for industrial mix indicates that industry growth rates were again the predominant factor. None of this period's employment variation was directly attributable to the industrial mix hypothesis.

End-of-period estimates for the final expansion reveal that Indiana's employment level exceeded both the employment level adjusted for U.S. industrial composition and the level simulated for the nation's growth rate. However, the small difference of 1,100 noted between actual and simulated employment levels may be considered negligible. This relationship suggests that while Indiana's industrial mix was favorable during this period, much of the State's potential employment increase was offset by less favorable industry growth, resulting in an employment increase roughly equal to national gains.

Among the most striking findings of this report is the substantial difference in the explanatory power of the industrial mix hypothesis observed when recessions and expansions are compared. An average of 55.9% of Indiana's cyclical employment variation, apart from that experienced by the nation as a whole, was attributable to our industrial mix hypothesis during the four recessions studied. In contrast, the industrial mix explanation was applicable in only one of the expansions, and in the February 1961-December 1969 and March 1975-January 1980 periods the State's industrial mix hurt, rather than helped, the State.

Observations and Interpretations

By applying U.S. growth rates in each period to Indiana data, we were able to simulate the job gains or losses that would have occurred at the state level given the nation's rate of change in employment. This calculation affords comparison of Indiana and U.S. performance in terms of job gains and losses. While the preceding narrative has isolated each contraction and expansion as a separate employment period, it will be useful to discuss the following data in terms of four major employment cycles, each consisting of one contraction and one expansion. **Table 5** lists the difference observed between actual Indiana employment and Indiana employment simulated for U.S. growth rates in each period. Compound annual gains or losses in employment experienced in the contraction and expansion of each employment cycle are also provided.

Since our industrial mix hypothesis anticipated greater employment losses at the state level during recessions (resulting in a negative actual minus simulated figure), and since these losses were largely offset during expansionary phases (illustrated by a positive actual minus simulated employment figure), Indiana's overall employment growth pattern during the first two employment cycles seems acceptable. However, the two full employment cycles that occurred since 1973 present a sharp contrast. The cycle from November 1973-January 1980 is the only one in which simulated employment exceeded actual employment in Indiana during both the recessionary and expansionary phases. Not only was this situation unique in itself but, additionally, the March 1975-January 1980 expansion provided the largest gap between actual and simulated employment of all employment periods studied. Consistent with this observation, the same period yielded one of the lowest compound annual growth rates among expansions at the Indiana level. The expansionary phase of this cycle is also unique in that both an unfavorable industrial mix and poor industry growth rates relative to national growth contributed to Indiana's poor performance. Combined recessionary and expansionary actual minus simulated shortfalls during this cycle were larger than those sustained in any other cycle, as actual Indiana employment lagged behind simulated Indiana employment by 179,000 jobs.

The final employment cycle (January 1980-July 1981) evidenced a severe, though markedly different, pattern of gains and losses. Again, a large gap between actual and simulated employment estimates is apparent during the recessionary phase. While the expansionary actual minus simulated gap once again favored the actual Indiana employment estimate, the difference was too small to offset any substantial portion of the recessionary shortfall. Further, this expansionary phase represents the only period of employment gain that failed to see Indiana employment return to pre-recession levels. Accordingly, Indiana's actual employment fell short of its simulated employment level for the full cycle by roughly 80,000 jobs, the second highest estimate observed during the period of study.

Viewing the four employment cycles as a whole, two additional observations are noteworthy. A cursory review of the actual minus simulated employment gap in the preceding table reveals a steady pattern of increasing shortfalls. Indiana employment declines during contractions exceeded national employment losses by increasing amounts throughout the period of study. However, Indiana employment gains failed to follow a similar pattern during expansionary periods. For the given period of study, we may conclude that Indiana became more procyclical during recessions, but failed to offset increasing losses by becoming more procyclical during expansions.

For the total period of study, we note that an average of just 30.7% of Indiana employment swings beyond the limits of U.S. employment swings resulted from Indiana's unique industrial mix. This observation leads us to conclude that at least one additional factor, differential intra-industry growth rates found at the state and national levels, played a significant role during the period of study. During the 1970s, several important sectors of the economy, including nondurables manufacturing, retail trade, finance, insurance, real estate, government and agriculture grew less rapidly in Indiana than at the national level. As previously noted in this report, the industry growth rate differential was clearly more influential during expansions than recessions.

The most striking feature of the employment patterns studied is found in the November 1973-January 1980 employment cycle. Both the character and severity of employment shortfalls experienced during this period suggest the intervention of some outside factor that is beyond the scope of this report. However, the following observations may suggest a plausible explanation for the employment patterns noted above.

The 1973 formation of the Organization of Petroleum Exporting Countries (OPEC) indirectly led to a quadrupling of world oil prices. Dramatic energy price increases were not confined to petroleum products alone, but instead extended to energy costs in general, as well as to other inputs to the manufacturing production process. Devaluation of the dollar during the period from 1971 to 1973 compounded this problem by further increasing the cost of imported materials needed for American manufacturing operations. These and other cost increasing factors served as constraints to investment and employment increases, particularly in energy intensive industries. Since energy is a particularly important manufacturing cost to many of the major employers found in Indiana, including the steel, glass, iron and steel foundry, nonferrous rolling and drawing, grain mill products and drug industries, the State may have been disproportionately affected by these events. Although it is difficult to estimate the influence of such factors, they no doubt augmented the employment losses sustained by Indiana and other states with a substantial proportion of energy intensive industries during this period.

The findings of this report suggest that the State of Indiana has experienced unique obstacles to economic growth in both recessions and expansions. Although most of the underlying causes cited are not subject to control by state government, their existence underscores the need for maintaining an aggressive approach to economic development. It is entirely possible that Indiana's current industrial development program, coupled with newly created economic development incentives, may provide the most realistic method available for improving the long-run growth of Indiana employment levels. ☐

Table 5

Actual Minus Simulated Indiana Employment with Compound Annual Rates of Change

			Compound Annual Rate of Change	
Employment Period		*Actual—Simulated Indiana Employment*	*Indiana*	*U.S.*
Contraction	April 1960-February 1961	−25,115	−5.5	−3.2
Expansion	February 1961-December 1969	+18,792	3.3	3.2
Contraction	December 1969-November 1970	−58,042	−6.1	−2.1
Expansion	November 1970-November 1973	+64,524	4.9	3.6
Contraction	November 1973-March 1975	−75,948	−5.6	−2.3
Expansion	March 1975-January 1980	−103,131	2.9	4.1
Contraction	January 1980-July 1980	−81,398	−11.7	−3.3
Expansion	July 1980-July 1981	+1,103	2.9	2.8

Input-Output Analysis for the Indiana Economy

Thomas W. Hertel, *Assistant Professor, and* **Lance McKinzie**, *Research Associate, Department of Agricultural Economics, Purdue University.*

Several factors contribute to an increased need for state-level economic analysis in Indiana. First among these is the fact that both the national and the state economies are in a period of transition. In particular, Indiana has a disproportionate share of the traditional, heavy industries, many of which are facing a decline nationwide. In addition, recent attempts to decentralize decision making under the "New Federalism" have encouraged individual states to take a larger role in managing their own economic destinies. The State of Indiana has responded with the most substantial economic development program ever enacted, conceived by the Indiana Department of Commerce. New employment and greater income within the state are primary objectives for the economic development plan.

One means of increasing employment and income is to increase the share of processing which is done within the state. This amounts to enlarging the value added to products prior to their export. For example, we have estimated that in 1977 Indiana shipped $3.8 billion worth of raw steel and blast furnace products, or 61% of production, out of the state—while importing from other states a net $40 million worth of steel pipe and tubes. Indiana also produces a surplus of grains yet is a net importer of prepared feeds and meat animals as well as packed meat products. Increased secondary processing of these and other products in Indiana would generate both direct and indirect business activity, jobs, and income. In this article, we present estimates of these statewide benefits. It is hoped that this will aid policymakers in targeting future feasibility studies and potential economic development initiatives.

The Input-Output Table

The input-output (I-O) table provides us with a snapshot of the state's economy at a given point in time. It accounts for all purchases and sales of goods and services among productive sectors, households, and government. Table 1 provides an outline of a highly aggregated input-output table. Entries are made initially in dollar terms. Row labels refer to sectors of origin and primary factor payments (value-added). Thus, the cross-hatched row identifies where the state's agricultural output goes. These entries sum to total gross agricultural output. Column labels identify purchasing sectors and final demand. "Final Demand" comprises household and government purchases, as well as investment and net exports. The cross-hatched column represents purchases by the agricultural sector. These are inputs to the production process and include purchases from other sectors as well as payments to primary factors (labor, capital, and indirect business taxes) which, when combined, amount to value-added. Both columns and rows in the table must sum to gross output, thus enforcing consistency between sources and uses of each sector's production.

But where does all this information come from? The U.S. Bureau of Commerce conducts an exhaustive survey every five years in order to generate a new I-O table for the U.S. economy. Ideally, measurement of interindustry relationships at the state level should be based on the same type of primary data. Unfortunately, the expense of conducting and processing such a state survey, on a regular basis, would be

Comments on Input-Output Analysis

Input-output analysis has been widely used in studies of state and regional economies, but the reliability of the variables used in these models has been subject to question. Some critics believe the numbers are not at all reliable and therefore have no confidence in the resulting analyses. The multipliers in the accompanying study are, in numerous cases, considerably larger than those reported in similar studies using different methods. In part, these large multipliers may result from the use of average, rather than marginal, relationships and the use of data for only one year.

Nevertheless, input-output studies are useful, as the authors state, because they show specifically the interindustry relations of an economy. One should keep in mind, however, that the results may be subject to large errors and should be used cautiously. Policy makers should consider these results as possible, but not certain, outcomes.

Whether it is feasible for Indiana to promote additional processing of raw materials depends upon the state's competitive position relative to other states that engage in this processing. The input-output model provides no information in this area, the key question for policy makers. As the authors point out, the costs and benefits associated with the promotion of any activity must be carefully assessed by the policy makers so that they do not "give away the store." ☐

Richard L. Pfister, Professor of Urban Economics, Indiana University School of Business prohibitive. Thus, virtually all regional I-O tables are based on non-survey techniques. These combine the state-level data which is available with detailed information from the national I-O table to create a snapshot of the regional economy at a given point in time.

The Steel Industry

The 1977 data presented in Table 2A demonstrate the importance of the steel industry to the Indiana economy. Indiana's raw steel production ($6.2 billion) represented about 16% of national output in that year. We estimate that 61% of that production was shipped to other states for further processing.[1] The remainder, approximately 6% of the nation's steel output, was utilized within the state. Much of the steel processed in Indiana represented inputs into the industries listed in Table 2A. Fabricated metal, metal stamping, cold finished steel (11% of national output), and wire industries added significant value

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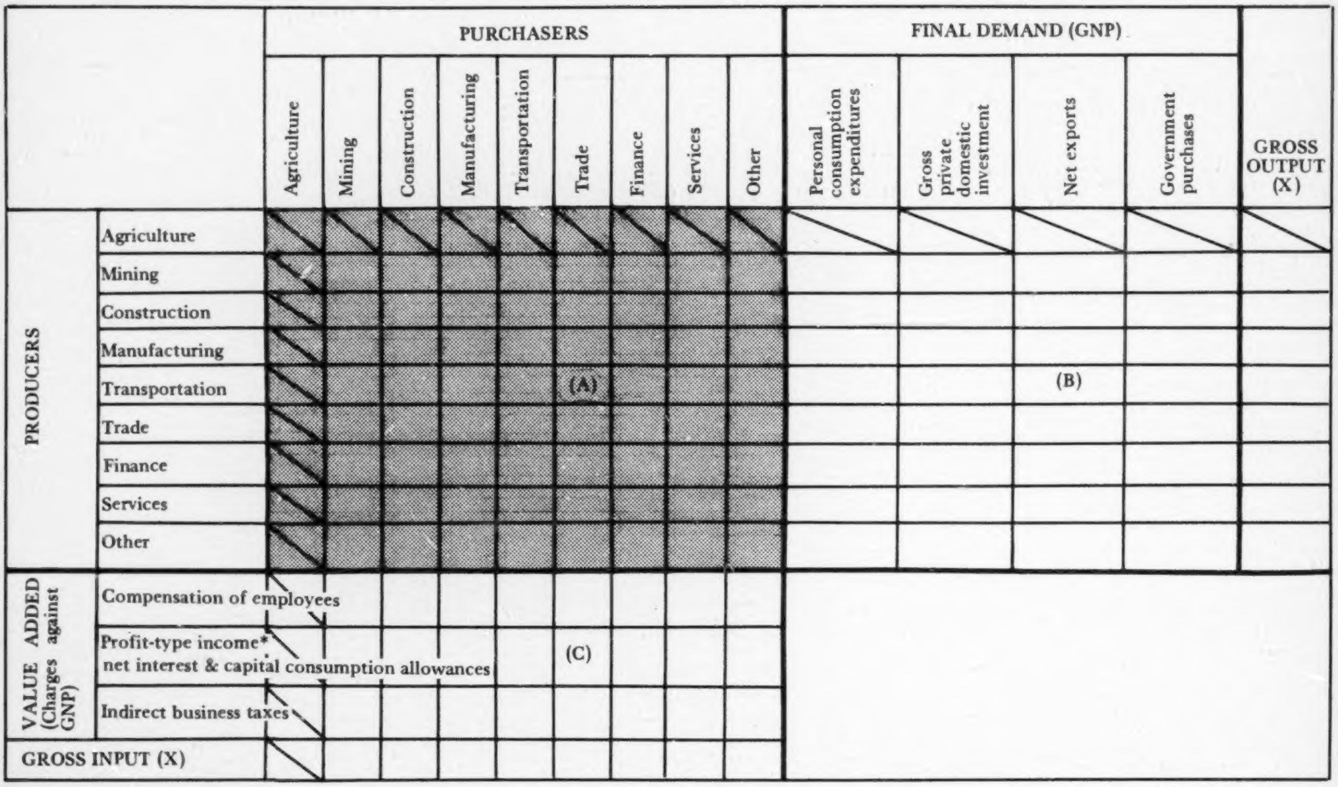
[1] The surplus and deficit figures in Tables 2A and 2B do not include net trade with the rest of the world. This could not be estimated (see Hertel and McKinzie: 6). In most sectors, net trade with the rest of the U.S. dominates net foreign trade, in which case the numbers in Tables 2A and 2B are indicative of the overall trade situation for Indiana.

Table 1

Input-Output Table



		PURCHASERS									FINAL DEMAND (GNP)				GROSS OUTPUT (X)
		Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Other	Personal consumption expenditures	Gross private domestic investment	Net exports	Government purchases	
PRODUCERS	Agriculture														
	Mining														
	Construction														
	Manufacturing														
	Transportation						(A)						(B)		
	Trade														
	Finance														
	Services														
	Other														
VALUE ADDED (Charges against GNP)	Compensation of employees														
	Profit-type income* net interest & capital consumption allowances						(C)								
	Indirect business taxes														
GROSS INPUT (X)															

*Consists of proprietors' income, rental income of persons, corporate profits, and business transfer payments, less subsidies, etc.

U.S. Department of Commerce, Bureau of Economic Analysis to raw steel before shipping much of their production out of the state. Indiana was estimated to be a net importer of several major secondary steel products, including steel pipe and tube, iron and steel forgings, and railroad equipment. The steel-using industries shown in Table 2A provided about 4.4% of the state's jobs, and raw steel production provided another 3%. Wage levels in these industries tended to be significantly above the state average of $13,500 per year.

Agriculture

Data in Table 2B indicate that, in 1977, Indiana produced about 4% of the nation's grains and 7% of oil-bearing crops (primarily soybeans). Significant quantities of each of these primary products are processed within the state.[2] Eighty-nine percent of blended and prepared flour production was shipped out of the state. Those shipments exceeded domestic usage by eight times. Indiana production accounted

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[2] In the case of grains and soybeans, foreign trade is extremely important. Exports to other countries from Indiana were estimated to be $150 million and $114 million, respectively, in 1977. These shipments are not included in the surplus total in Table 2B (see also footnote 1).

Table 2A

Data on Selected Sectors of the Indiana Economy (1977)

	Gross Output			*Indiana Surplus*			*Employment*				
			IN/U.S.		*Percent of:*				*Wages/Job*	*Output/Job*	*Sales Multipliers*
Industry	*U.S.*	*IN*	*U.S.*	*Total*	*Use*	*Production*	*Jobs*	*Wages*			
	(Million $)		*Percent*	*(1000 $)*	*Percent*	*Percent*	*Number*	*(1000 $)*	*$*	*$*	
Blast Furnace & Steel	39529	6203	16	3808213	161	61	56690	1328625	23437	109420	1.61
Other Furniture and Fixtures	5632	181	3	5292	3	3	5060	60889	12031	35847	1.61
Steel Wire and Related Products	2227	100	4	11186	13	11	906	15636	17255	110351	1.74
Cold Finished Steel	2723	311	11	150354	95	48	664	15288	23013	467861	2.01
Steel Pipe and Tube	3010	133	4	–40168	–23	–30	272	4501	16518	488807	1.89
Iron and Steel Forgings	2618	90	3	–20735	–17	–21	1421	26461	18627	63635	1.82
Metal Containers	8823	442	5	189539	76	43	1917	45886	23931	230416	1.89
Fabric Metal	22991	843	4	127644	19	15	16397	2468836	15056	51387	1.80
Screw Machine Products	5054	168	3	–82722	–33	–49	3521	56983	16183	47798	1.67
Metal Stamping	14731	1036	7	357689	55	34	19093	438909	22988	54288	1.72
Cutlery, Hardware, General	8177	271	3	–35341	–120	–13	5277	81627	15469	51301	1.56
Other Fabricated Metal	17104	811	5	161361	26	20	12752	195176	15305	63589	1.64
Farm Machinery	11579	380	3	17076	5	4	4971	108577	21841	76481	1.78
Material Handling Machinery	4766	140	3	–4226	–3	–3	2977	39142	13059	46644	1.72

Source: McKinzie and Hertel (1984).

Table 2B

Data on Selected Sectors of the Indiana Economy (1977)

	Gross Output			*Indiana Surplus*			*Employment*				
			IN/U.S.		*Percent of:*				*Wages/Job*	*Output/Job*	*Sales Multiplier*
Industry	*U.S.*	*IN*	*U.S.*	*Total*	*Use*	*Production*	*Jobs*	*Wages*			
	(Million $)		*Percent*	*$1000*	*Percent*	*Percent*	*Number*	*(1000 $)*	*$*	*$*	
Grains	28635	1135	4	231796	31	20	11332	4635	4080	100123	1.51
Flour and Other Grains	3595	101	3	4110	4	4	1004	22625	22526	100856	1.98
Blended and Prepared Flour	1089	250	23	222810	818	89	1135	19360	17055	220529	1.90
Pet Food	3146	14		–69902	–82	–510	134	3888	29076	102132	2.09
Wet Corn Milling	2018	302	15	234177	388	78	1423	51570	36233	212183	1.91
Oil-Bearing Crops	10106	719	7	210406	53	29	8005	32660	4080	89826	1.39
Prepared Feeds	10203	233	2	–18666	–6	–8	2204	49356	22394	105672	2.51
Fats and Oils	13408	819	6	384363	102	47	2668	73271	27464	307058	2.22
Miscellaneous Chemicals	7996	119	1	–106281	–48	–89	923	7217	7822	129294	1.57
Paints	6251	105	2	–90330	–45	–84	1326	25823	19480	79436	1.62

Source: McKinzie and Hertel (1984).

for 23% of the nation's output. The Indiana wet corn milling industry processed 15% of the nation's wet milled corn. It also has the highest imputed average wage (see Wages/Job column in Table 2B) of those sectors studied.

Soybean processing (fats and oils) in the state accounted for about 6% of national oil meal processing. Slightly more than half of that output was shipped out of the state without further processing. The outputs from soybean processing which are not directly exported from the state are widely dispersed throughout the economy, with relatively small amounts going to a large number of industries. While the prepared feed industry requires sizable inputs from the grains sector, it is listed under oil-bearing crops since significant quantities of soybeans are utilized by the feed industry. Two other manufacturing industries which utilize significant quantities of input from the fats and oils sector are miscellaneous chemicals and paints. Indiana was a significant importer of both of these products.

Sales Multipliers

When output in a given sector increases, there are both direct and indirect effects on the remainder of the state's economy. If sales to final demand for one product increase by $1, then gross output of that sector must increase by $1. This is the direct effect. But indirect effects also ripple through the remainder of the economy. These arise because the inputs necessary to produce the finished product place increased demands on the firm's suppliers. For example, **Table 3** provides 1977 estimates of some of the direct input requirements for selected primary metals and metal fabrication sectors. Blast furnaces show large requirements for coal and other energy inputs, and the output from this sector represents a large portion of the inputs into the other three industries. Machinery and maintenance and repair inputs are also important, as are the services of transportation and wholesale trade sectors. The four purchasing sectors in Table 3 are clearly highly interdependent. For example, a decline in the demand for cold finished steel will cause a substantial decline in basic steel requirements which, in turn, will affect numerous other sectors. These effects are captured in the sectoral sales multipliers, which measure the direct and indirect change in economy-wide gross output when final demand for a given product changes by $1.

Sales multipliers for selected Indiana steel and agricultural sectors are provided in the last column of Tables 2A and 2B. The larger sales multipliers indicate greater indirect effects. Processed products tend to have larger multipliers due to the fact that they require raw materials which, in turn, require other inputs to be produced. This chain, extending back from the final product through the processing activities to the raw materials, and beyond, may be termed the "backward linkage" associated with a given product. Of course, these "backward linkages" tend to be more extensive as the degree of processing increases. Furthermore, if the raw materials are imported, then the backward linkages do not stimulate the Indiana economy. As a result, we expect that the import-intensive sectors

Table 3

Production Requirements in Selected Metals Sectors: 1977 ($1,000)

	Purchasing Sector			
Selected Indiana Producing Sectors	*Blast Furnace Basic Steel*	*Iron and Steel Foundries*	*Cold Finished Steel Shaping*	*Metal Shapings*
Coal Mining	155,712	45	463	277
Maintenance and Repair	39,237	616	2,596	1,735
Industrial Chemicals	31,518	6,191	195	1,070
Petroleum Refining	79,210	3,977	3,442	4,830
Lime, Gypsum	25,037	0	31	8
Miscellaneous Stone and Clay	26,198	2,977	5,352	2,312
Blast Furnace, Steel	699,959	105,387	28,343	216,930
Cold Finished Steel Shaping	49,436	8,536	1,850	14,543
Steel Pipe and Tubes	38,041	5,817	1,505	12,004
Iron and Steel Foundries	75,834	2,226	4,512	2,115
Metal Heat Treatment	11,967	765	4,761	1,958
Other Primary Copper Products	13,144	700	224	12,349
Primary Aluminum and Products	12,162	193	1,489	27,345
Other Primary Non-ferrous	80,880	2,250	2,921	5,306
Screw Machine Products	21,558	1,908	31	6,389
Metal Stampings	13,400	174	258	24,556
Other Fabricated Metal	59,283	8,440	392	9,475
Metalworking Machinery	25,415	1,192	3,180	5,884
General Industrial Machinery	74,375	8,190	16,770	892
Machine Shops	8,782	3,203	9,132	7,972
Electrical Industrial Apparatus	28,241	643	10,134	1,748
Railroad Transportation	96,793	1,530	2,904	2,468
Truck Transportation	21,885	823	1,598	1,756
Electric Utilities	95,472	1,923	10,982	6,076
Gas Utilities	73,146	1,356	3,785	1,635
Wholesale Trade	247,554	4,954	30,634	29,035
Miscellaneous Business Services	24,106	2,821	2,611	2,942
Scrap, Used Goods	75,675	0	12,550	709
Total Intermediate Inputs	2,487,441	196,886	191,396	465 731
Indiana Imports	1,183,713	49,511	37,862	53,035
Value Added	2,531,846	293,303	81,542	517,734
Gross Output	6,203,000	539,700	310,800	1,036,500

Source: Hertel and McKinzie (1983).

have lower sales multipliers than those sectors which utilize local raw materials.

As noted above, the sectors in Tables 2A and 2B have been grouped according to primary products—raw steel, grains, and oil-bearing crops—followed by several processed products requiring significant quantities of the primary product as inputs. Multipliers for all but a very few of the processed products are higher than those for the associated raw products. Multipliers for processed agricultural products tend to be higher than those for steel, due to the fact that the majority of raw agricultural inputs are produced within the state. The steel industry, however, requires a significant amount of imported fuel and iron ore.

Employment Multipliers

Although it is useful to measure the sales impact of an exogenous change in final demand, it is the resulting change in employment and income which is of primary interest to policy makers. In order to translate increases in gross output into a change in employment, the sales multipliers are weighted by the employment generated per dollar of gross output. These new multipliers measure the increase in economy-wide employment resulting from the creation of an additional job in a given sector. They are provided, for selected sectors, in Table 4. Where possible, primary products are grouped with their respective processing sectors. Once again, the latter tend to have larger employment multipliers due to the increased effort embodied in producing a finished product.

The largest employment multiplier for all sectors is found in cold finished steel (7.26). A drop in demand for this sector's product that results in the loss of 100 employees can be expected to eventually lead to the loss of 626 additional jobs elsewhere in the economy. Some of those jobs will be in basic steel (blast furnaces) which itself has an employment multiplier of 2.01. Table 5 systematically decomposes the employment multiplier associated with cold finished steel. It can be seen that the backward linkage to basic steel production is indeed very large. The loss of one job in cold finished steel is estimated to result in the eventual loss of 1.8 jobs in basic steel.

The other entries in Table 5 emphasize once again the close links among primary metals and fabrication activities, machinery, equipment, transportation, and service sectors. The seventeen sectors in this table encompass 75% of the direct and indirect job losses when the demand for Indiana's cold finished steel drops. The remaining effects are spread fairly uniformly over a large number of sectors.

Table 4

Employment Multipliers for Selected Sectors in Indiana

Sector	*Multipliers*
Primary Metals and Fabrication	
Cold Finished Steel Shaping	7.26
Steel Pipe and Tubes	6.78
Primary Aluminum and Products	2.49
Blast Furnace	2.01
Metal Stamping	1.52
Iron and Steel Foundries	1.37
Crops and Processing	
Fats and Oils	5.19
Blended Flour	3.45
Wet Corn Mill	3.23
Prepared Feed	2.58
Flour	2.19
Grains	1.58
Soybeans	1.42
Livestock and Products	
Meat Packing	3.90
Sausages and Other	3.63
Meat Animals	2.83
Poultry Dressing	2.51
Poultry and Eggs	2.14
Dairy Products	
Cheese	3.37
Milk	3.01
Condensed and Evaporated Milk	3.01
Dairy Farms	2.20
Other Manufacturing	
Motor Vehicles	2.30
Agricultural Chemicals	2.09
Farm Machinery	1.99
Drugs	1.93
Aircraft	1.82
Canned Vegetables	1.71
Industrial Chemicals	1.70
Energy	
Petroleum Refining	2.37
Oil and Gas	1.60
Coal	1.49

Source: Hertel and McKinzie (1983).

Refer again to Table 4 and note that cold finished steel shaping and steel pipe and tubes are rather exceptional sectors as measured by their employment multipliers. The next largest numbers appear in the agricultural processing area. Indeed, these sectors make up over half (12 of 21) of the top 10% of Indiana industries, ranked by employment multipliers. This is a reflection of the large sales multipliers mentioned above, as well as the relatively low employment/output ratio in commercial agriculture.

Effects of Increasing Value-Added

The difference between the economic multipliers for raw vs. processed products underscores the importance of analyzing the potential for increasing the processing

Table 5

Decomposing the Employment Multiplier for Cold Finished Steel Shaping

Sector in Which Employment Declines	*Number of Jobs Lost*
Maintenance and Repair	0.107
Industrial Chemicals	0.108
Miscellaneous Stone and Clay	0.112
Blast Furnace, Steel	1.798
Cold Finished Steel Shaping	1.033
Iron and Steel Foundries	0.183
Other Primary Non-ferrous	0.247
Other Fabricated Metal	0.265
Metalworking Machinery	0.107
General Industrial Machinery	0.296
Machine Shops	0.116
Electrical Transportation Equipment	0.114
Electrical Industrial Apparatus	0.111
Railload Transportation	0.237
Truck Transportation	0.223
Wholesale Trade	0.128
Miscellaneous Business Services	0.267
Subtotal	5.452
Other Sectors	1.807
Total Employment Multiplier	7.259

Source: Hertel and McKinzie (1983).

of raw products prior to their export from Indiana. Clearly there will be benefits, in the form of additional jobs, when the value-added embodied in exports is increased. However, to the extent that subsidies and concessions are used to attract additional manufacturing activity, it is important that policy makers have a fairly accurate picture of the magnitude of these benefits. Without this information they run the risk of "giving away the store." That is, in their enthusiasm for attracting new economic activity, they may give industries concessions whose costs exceed the benefits accruing to the state's economy. Since the methods used in this article tend to provide an upper bound on the potential gains attributable to new processing activity, concessions exceeding our estimated benefits must be seriously questioned.

Steel. Table 6 presents information on the effect of increasing the processing of raw steel in Indiana. The (direct and indirect) intermediate input coefficients in column 1 tell us, for example, that a total of $0.42 worth of raw steel is required from the blast furnace for the production of $1.00 of cold finished steel. When we take into account the fact that raw steel is required as an input into its own production, we find that $1.00 of raw steel is sufficient to produce $2.73 of cold finished steel. This is the "export expansion multiplier" given in column 2 of Table 6.

Next, we assume that other intermediate inputs, as well as the capital and labor necessary to process the raw steel, are forthcoming in perfectly elastic supply. (In other words, our estimates assume that if the demand for Indiana value-added increases, we can respond by increasing production, at relatively constant costs.) The resulting increases in gross state output, employment, and income due to the processing of an additional $1 million of raw steel are provided in columns 3, 4, and 5 of Table 6. These indicate that if, in place of the raw steel, $2.726 million of cold finished steel were exported, gross state output would increase by $3.867 million and 24 more jobs, paying $415,000, would be created. Of course, if our basic assumption about factor supplies

Table 6

Implications of Additional Processing of Raw Steel Within Indiana

			Effect of Foregoing $1 Million Raw Product Exports		
	1	*2*	*3*	*4*	*5*
Processed Product	*Intermediate Input Coefficient*[1]	*Export Expansion Multiplier*	*Economic Activity Multiplier*	*No. Jobs /Million $*	*Wage Income /$1000*
Cold Finished Steel	.420	2.726	3.867	24	415
Iron and Steel Forgings	.366	3.133	4.084	64	1143
Steel Pipe and Tube	.350	3.185	4.392	27	406
Metal Containers	.311	3.681	5.335	40	786
Steel Wire and Related Products	.270	4.243	5.759	64	1048
Metal Stampings	.263	4.351	5.889	104	2218
Fabricated Metal	.241	4.762	6.972	127	1939
Screw Machining Products	.191	6.015	8.456	167	2637
Material Handling Machines	.127	9.003	13.864	283	3903
Farm Machinery	.111	10.311	16.786	249	4916
Other Fabricated Metal	.108	10.635	15.812	253	3860
Cutlery Hardware General	.108	10.647	15.012	289	4368
Other Furniture and Fixtures	.103	11.163	16.396	409	5115

1. The intermediate input coefficient provides the direct and indirect raw steel requirements necessary to supply $1 of a given product to the processing sectors.

Source: McKinzie and Hertel (1984).

Table 7

Implications of Additional Processing of Grains and Soybeans Within Indiana

			Effect of Foregoing $1 Million Raw Product Exports		
	1	*2*	*3*	*4*	*5*
Processed Product	*Intermediate Input Coefficient*	*Export Expansion Multiplier*	*Economic Activity Multiplier*	*No. Jobs /Million $*	*Wage Income /$1000*
Grains					
Flour and Other Grains	.536	1.950	2.350	27	544
Wet Corn Milling	.436	2.396	3.057	21	564
Meat Animal	.420	2.490	4.612	45	389
Meat Packing	.306	3.410	8.579	75	779
Dairy Farms	.298	3.510	5.120	92	730
Poultry and Egg Farms	.256	4.086	8.970	128	1281
Prepared Feed	.222	4.711	10.317	99	1905
Poultry Dressing	.168	6.204	16.108	247	2567
Blended Prepared Flour	.164	6.359	10.555	85	1359
Sausages and Other	.143	7.288	17.921	155	2019
Poultry and Egg Processing	.124	8.405	19.973	328	2899
Fluid Milk	.113	9.220	17.198	203	2474
Soybeans					
Fats and Oils	.498	2.096	3.275	20	374
Prepared Feeds	.136	7.644	17.802	171	3177

Source: McKinzie and Hertel (1984).

is not satisfied, and input prices rise, then the increase in output will be dampened. In this sense these numbers represent upper bounds on the economy-wide benefits of increasing value-added.

The sheer size of Indiana's raw steel surplus suggests that substantial opportunities for additional processing are present. The estimated employment effects presented in Table 4 provide state policymakers with information to evaluate the economic effects of alternative development strategies and to compare different alternatives. In 1977, Indiana produced 16% of the nation's raw steel but only 11% of cold finished steel. One might ask what would happen if Indiana were to produce an equivalent share of cold finished steel (from Table 2A, 16% of $2.723 billion = $435 million). Cold finished steel processing in the state would need to be increased by about $125 million. The state's raw steel surplus would decrease by $52 million (about 1.4%). Economic activity in the state would increase by $177 million. State employment would increase by 1,125 jobs, and wage compensation in the state would increase by $19 million.

Other processed products embodying significant amounts of raw steel are listed in Table 6 as well. They are ordered according to the amount of raw steel required per dollar of output (direct and indirect intermediate input coefficient). It is hardly surprising that the economic activity multipliers increase as the intermediate input coefficient drops. When this coefficient is small, it means that many other goods and services must be combined with the raw steel before the processed product is complete. Since we are assuming these other goods are in perfectly elastic supply, the estimates become less and less plausible as we move down the list.

Agricultural Crops. Substantial amounts of grain are processed directly in Indiana. Indiana's share of national wet corn milling was 15% and 23% for blended and prepared flour (see Table 2B). Turning to Table 7, we see that if the state were somehow to capture an additional 5% of the nation's wet corn milling, say $100 million, foregoing shipments out of the state of $44 million worth of unprocessed corn, economic activity within the state would increase by $305 million, 2,100 new jobs would be created, and wage income within the state would increase by $564,000.

Significant amounts of Indiana grain are also fed to livestock. Hence, livestock production and processing activities can also be considered as grain "processing" activities. In fact, the largest possible gains from utilization of surplus grain in the state derive from feeding the grain to livestock and subsequently processing the meat. If the state were to increase production of dressed poultry by $7.7 million (roughly 10% of the current deficit) by foregoing $1.3 million in unprocessed grain shipments, economic activity within the state would increase by $120 million, 1,900 new jobs would be created, and wage income in Indiana would increase by $20 million.

Nearly 30% of Indiana soybeans are exported to other states in unprocessed form ($210 million surplus). About 57% of the state's soybean production ($408 million) is required by the state's fats and oils industry. Expanding soybean processing to utilize all of the state's $210 million soybean surplus would mean increasing the level of fats and oils output by $422 million, creating 4,200 new jobs in the state, and generating $78 million additional wage income (see Table 7).

Input output analysis is a useful tool for measuring the likely effects of some of the changes which the Indiana economy is currently experiencing. Its particular strength rests in its ability to take into account the interdependent nature of production processes. Thus, we have been able to generate economic multipliers which capture both direct and indirect effects of an exogenous change in a given sector's output. We have also been able to examine the likely benefits associated with increasing the value-added embodied in Indiana exports. We hope that the availability of this type of information will assist policy makers in designing future economic development strategies. ☐

References

Hertel, Thomas W. and Lance McKinzie, *A Structural Analysis of the Indiana Economy*, Purdue University Agricultural Experiment Station Bulletin No. 434, Agricultural Economics Department, Purdue University, West Lafayette, Indiana, 1983.

Indiana Department of Commerce, *Orr/Mutz Economic Development Package: Phases I, II, III—Director of Services*, Indiana Commerce Center, One North Capital, Suite 700, Indianapolis, Indiana 46204-2248.

McKinzie, Lance and Thomas W. Hertel, *Implications for the Indiana State Economy of Increasing Value-Added in Steel and Agricultural Exports*, Purdue University Experiment Station Bulletin (forthcoming), Agricultural Economics Department, Purdue University, West Lafayette, Indiana, 1984.

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Morton J. Marcus and John C.S. Lim **Tentative Household Projections for Indiana Counties**

Graham S. Toft and F. Dale Parent **The Economic Performance of Indiana: A Comparison of Metropolitan Economies**

In this issue . . .

The economic condition of metropolitan areas of Indiana is of utmost importance to the state's future. Although our population is dispersed through cities large and small and scattered along country roads so that at night lights from our homes give the impression of widespread habitation, it is in our cities that the economic base of our state is anchored. Graham Toft and Dale Parent examine the recent changes in our metropolitan areas and offer several important observations.

Morton J. Marcus
Editor

> Many plans for the future are based on the number of households rather than on the number of persons. To begin a research effort in household projections, we have developed a preliminary and most tentative set of county data. Our readers can help by indicating to us their interest in the continuation of this activity.
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Tentative Household Projections for Indiana Counties

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The release of Indiana's county population projections in the August 1983 issue of the *Indiana Business Review* stimulated inquiries about the meaning of those data for various sectors of the state's economy. In this article we attempt a most tentative approach to answering one such question relating to the housing industry: How will households change in Indiana's counties in the remainder of this century?

The number of households is of importance to realtors, mortgage lenders, and the many companies in the housing construction industry. Also interested in these data are all firms and governments which see their clients or customers in terms of households. Telephone, gas, electric, water, and sewer services are provided to households. Newspapers are delivered to and garbage is collected from households. The number of persons in each household is of consequence, but the basic unit for market analysis is most often the household rather than the person.

Statewide Projections

Indiana's population is projected to grow by 365,300 (6.7%) between 1980 and 2000, a very slow rate of increase compared to other twenty-year periods. (see Table 1.) This does not mean, however that the number of households will also increase at the same slow rate. Two other factors are important in predicting changes in the number of households: changes in the number of persons per household and changes in the number of persons of household-forming ages.

Table 1

Percent Change in Indiana's Population For Selected 20-Year Periods

1880 to 1900	27.2
1900 to 1920	16.4
1920 to 1940	17.0
1940 to 1960	36.0
1960 to 1980	17.8
1980 to 2000 (projected)	6.7

During the 1960s, there was little difference between the rate of growth in the total population and the growth of the population age 20 and older. But in the 1970s, the total Hoosier population grew by only 5.7% while the 20 and older population grew by 15.6%. The increase in the number of housing units (19.8%) was more closely allied with the growth rate of the adult population than with the growth rate of the total population. Since adults form households, their numbers occupy our attention for projections of household growth. In the 1970s, we estimate that 79% of the growth in Indiana households resulted from the increase in the adult population and 21% from other social and economic forces.

In **Table 2** we present Indiana's population and household history from 1960 to 1980 and projections to 2000. The projections are based on an assumed linear decline in the ratio of persons age 20 and older per household. We offer no science or sociology for this projection. It is a speculation that the economic and social forces which have tended to decrease the average size of households will continue to hold sway for the remainder of the century. These forces have been documented by authors making megabucks from the microtrends of households: later marriage, divorce, longer lives, longer periods of independence for the elderly.

These tentative projections indicate an increase of 457,300 households in Indiana from 1980 to 2000. This 23.7% increase contrasts with the small (6.7%) increase in total population and the moderate (14.7%) increase in persons age 20 and older. The increase in households can be divided between the increase in population and the change in lifestyle. Thus, if the number of persons age 20 and older per household were to remain constant at the 1980 level (1.895), 283,600 more households would result just from growth in the adult population. This increase would account for

62.0% of the total growth projected. The remaining 173,700 households are formed by the assumed decrease in the number of adults per household (1.757 in 2000).

County Projections

Indiana's 92 counties vary considerably in their population-household ratios, reflecting the diverse opportunities available to the equally diverse populations in the state. For example, in 1980, 70.6% of the population in Vanderburgh County (Evansville) was age 20 or older. In Lagrange County, 59.3% of the population was in the adult age group. By the end of the century, it is projected that 78.5% of Vanderburgh County's population will be age 20 and older; in Lagrange County, 63.5% of the population will be in that age group.

Table 3 provides the tentative projections for households in each Indiana county. It has been assumed that each county retains its position relative to the state in terms of its ratio of population age 20 and older to households. Thus, for example, the ratio of population per household in Putnam County was 2.077 in 1980. With the state ratio moving from 1.895 to 1.824 in 1990, Putnam County was assumed to have changed by the same relative amount, yielding an adult population to household ratio of 1.999 in 1990.

$$\text{Putnam 1980} \times \frac{\text{Indiana 1990}}{\text{Indiana 1980}} = \text{Putnam 1990}$$

$$2.077 \times \frac{1.824}{1.895} = 1.999$$

This same procedure was followed for each county to yield the required adult population-to-household ratio for 1990 and for 2000.

Unlike the population projections which indicated that several counties would decline in population between 1980 and 2000, these household projections indicate a decline only in Benton County. At the other end of the growth spectrum, Hamilton County was projected to grow by 46.6% in population and 81.6% in households in the next twenty-year period.

Concluding Note

These household projections tend to follow the population projections offered in these pages in August 1983. They also reflect changing age distributions; counties with rapidly growing adult populations show greater increases in number of households than increases in number of children.

These projections of households are not projections of home building. Even if there were no growth in households, there would be a demand for new housing based on the deterioration and deletions from the existing housing stock which take place even in stagnant or declining areas.

Readers of this article who find these projections of interest will note that they are labeled "tentative." We believe that more detailed analysis is warranted before any household projections are accepted. If these projections are of interest, we would appreciate a short note encouraging us to continue this activity. From the responses of concerned users, we can determine appropriate directions for our studies. ☐

Table 2

Indiana Population and Households—1960 to 2000

Year	*Number of Occupied Households*	*Total Persons All Ages*	*Persons Per Household*	*Persons 20 and Older*	*Persons 20 and Older Per Household*
1960	1,387,878	4,662,498	3.359	2,835,232	2.043
Percent Change	16.0	11.4		11.5	
1970	1,609,494	5,193,669	3.227	3,160,836	1.964
Percent Change	19.8	5.7		15.6	
1980	1,928,375	5,490,179	2.847	3,653,951	1.895
Percent Change*	12.8	3.3		8.6	
1990*	2,175,954	5,673,900	2.608	3,968,940	1.824
Percent Change*	9.6	3.2		5.6	
2000*	2,385,700	5,855,500	2.454	4,191,700	1.757

*Projected values

Table 3

Number of Households in Indiana Counties, 1980-2000

County	1980 Census	1990 (Projected)	2000 (Projected)	Percent Change
Adams	9,650	11,200	12,900	34.0
Allen	104,278	119,000	131,400	26.0
Bartholomew	22,809	27,600	31,200	37.0
Benton	3,654	3,500	3,600	−2.8
Blackford	5,536	5,800	5,900	7.4
Boone	12,663	15,500	17,900	41.4
Brown	4,422	5,900	7,100	61.0
Carroll	7,007	8,300	9,200	31.6
Cass	14,675	15,900	17,200	17.1
Clark	31,067	38,100	44,100	41.9
Clay	9,243	10,100	10,800	17.3
Clinton	11,297	12,100	13,000	15.4
Crawford	3,465	4,400	5,200	49.8
Daviess	9,905	10,700	11,600	17.3
Dearborn	11,493	14,200	16,400	42.9
Decatur	8,050	9,000	9,900	23.4
Dekalb	11,424	13,100	14,900	30.4
Delaware	44,692	47,100	48,900	9.3
Dubois	11,288	13,800	15,400	36.7
Elkhart	48,242	56,400	63,700	32.1
Fayette	9,979	11,500	12,800	28.0
Floyd	21,463	25,100	28,100	31.0
Fountain	6,888	7,800	8,400	21.6
Franklin	6,152	7,500	8,900	44.0
Fulton	7,194	8.400	9,300	29.1
Gibson	12,171	14,000	15,300	25.8
Grant	28,000	29,500	30,600	9.3
Greene	11,622	13,400	14,800	27.0
Hamilton	27,222	39,000	49,400	81.6
Hancock	14,439	18,900	22,500	55.5
Harrison	9,036	12,200	15,000	66.4
Hendricks	22,726	29,900	35,900	57.9
Henry	18,787	20,400	21,800	16.0
Howard	31,101	35,000	38,300	23.1
Huntington	12,400	13,400	14,600	17.7
Jackson	12,994	15,000	16,800	29.2
Jasper	8,328	11,100	13,600	62.8
Jay	8,383	9,000	9,500	13.0
Jefferson	10,320	12,500	14,000	36.0
Jennings	7,306	9,100	10,500	44.0
Johnson	25,341	33,000	39,300	54.9
Knox	15,511	16,700	17,000	9.8
Kosciusko	20,810	26,400	31,200	49.9
Lagrange	7,748	10,000	12,100	56.6
Lake	175,631	178,500	187,700	6.9
LaPorte	37,343	41,400	44,700	19.8

County	1980 Census	1990 (Projected
Lawrence	15,553	18,200
Madison	50,076	54,700
Marion	285,094	300,700
Marshall	13,669	15,900
Martin	3,806	4,100
Miami	13,694	15,300
Monroe	33,734	38,100
Montgomery	12,953	14,800
Morgan	17,184	21,300
Newton	5,070	6,500
Noble	12,079	14,400
Ohio	1,798	2,300
Orange	6,758	7,800
Owen	5,695	7,500
Parke	5,962	7,000
Perry	6,779	7,300
Pike	5,098	5,900
Porter	39,238	55,500
Posey	9,021	11,400
Pulaski	4,701	5,200
Putnam	9,445	11,000
Randolph	10.719	11,900
Ripley	8,157	9,800
Rush	6,636	6,700
St. Joseph	86,241	91,500
Scott	6,680	8,300
Shelby	13,905	15,800
Spencer	6,388	7,700
Starke	7,510	8,900
Steuben	8,747	11,200
Sullivan	7,965	8,800
Switzerland	2,535	3,000
Tippecanoe	40,759	44,300
Tipton	5,989	6,500
Union	2,403	2,600
Vanderburgh	64,110	68,400
Vermillion	6,934	8,000
Vigo	40,374	41,200
Wabash	12,601	14,100
Warren	3,077	3,400
Warrick	13,735	19,700
Washington	7,554	8,900
Wayne	27,508	28,600
Wells	8,838	10,200
White	8,846	10,200
Whitley	9,002	10,400

2000 (Projected)	*Percent Change*
20,100	29.2
58,200	16.3
309,800	8.7
17,900	31.1
4,400	14.8
16,900	23.5
40,900	21.3
16,000	23.4
24,600	43.0
7,900	55.9
16,600	37.8
2,700	48.0
8,500	25.6
8,900	56.2
7,800	31.4
7,700	12.9
6,500	27.4
69,500	77.1
13,400	48.7
5,600	19.7
11,600	22.8
13,000	21.7
11,200	37.1
7,000	5.0
94,800	9.9
9,600	43.4
17,400	25.3
8,800	37.5
10,000	33.4
12,900	47.1
9,400	18.1
3,400	34.6
47,300	16.0
7,000	16.4
2,900	22.4
70,500	10.0
8,700	25.5
42,400	5.1
15,200	20.3
3,700	21.5
25,500	85.4
10,300	36.2
29,500	7.3
11,500	29.8
11,300	28.1
11,900	31.6

The Economic Performance of Indiana: A Comparison of Metropolitan Economies

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Reporting and analyzing economic performance by states, or even by nations, can be misleading. These units are political creations, and their boundaries may have little in common with those of homogeneous socioeconomic regions. This particularly applies to Indiana, which has been depicted by Joel Garreau in *The Nine Nations of North America* as a state on the border of the "nations" of the Foundry, the Breadbasket, and Dixie (see **Figure 1**). Aggregation of economic statistics and indicators on a statewide basis in Indiana does injustice to its heterogeneity and can disguise the relative performance of regions and metropolitan areas, thus concealing opportunities for and threats to economic strategy. Furthermore, it can lead to muddled thinking regarding the appropriateness of statewide initiatives for economic development.

This article examines the economic performance of Indiana between the recessions of 1975 and 1982 by comparing its metropolitan economies. The logic for such an approach stems from growing recognition of the significance of metropolitan areas as engines for growth in a nation's (or state's) economy. Jane Jacob's recent articles in the *Atlantic Monthly* (March and April 1984) eloquently explain the concept of urban areas as centers of research, innovation, enterprise, and finance. Any plan—national, state, or regional—to reshape economic life must take account of its cities.

This article has four major purposes:

- To demonstrate that, with a few exceptions, Indiana's metropolitan economies worsened between 1975 and 1982.
- To challenge the assumption that Indiana's future economic growth lies in the nonmanufacturing (service) sector.
- To stress the importance of balanced growth between manufacturing and nonmanufacturing for a healthy metropolitan economy.
- To highlight the importance of regional and metropolitan considerations in a statewide economic development strategy.

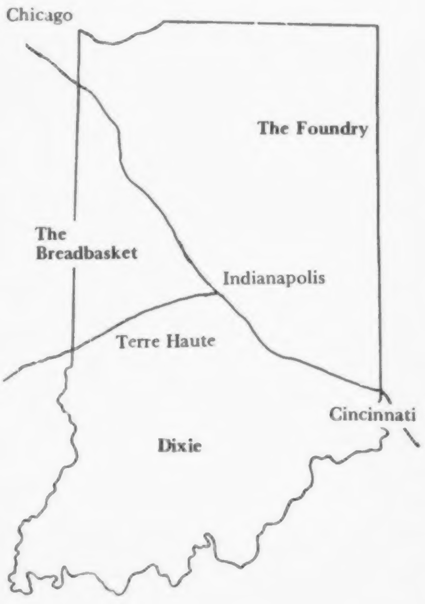
Data from the last two major recessions, 1973-75 and 1981-82, are compared. These time periods were separated by a recovery from 1976 to 1979 and a mild recession in 1980. Comparable metropolitan data on employment growth rates could not be obtained for 1975, so 1976 data were used in Figures 3 and 4.

Unemployment

One primary indicator of Indiana's economic condition is its unemployment rate compared to the national rate. As illustrated in **Figure 2**, Indiana's average unemployment rate was slightly below that of the nation during the 1975 recession.

Figure 1

Indiana's Economic Geography According to Joel Garreau in *The Nine Nations of North America*



During the 1982 recession, however, the state's unemployment exceeded the nation's by 23 percent. Only three of the state's Standard Metropolitan Statistical Areas (SMSAs)—Lafayette, Indianapolis, and Bloomington—had a lower rate than the nation in 1982 even though unemployment in Lafayette and Indianapolis increased between 1975 and 1982. Lafayette was the only area with an unemployment rate substantially below that of the United States as a whole in 1982.

Bloomington and Elkhart were the only two areas in the state to experience improvement in the unemployment rate between 1975 and 1982. Unlike Bloomington, Elkhart remained above the national average in 1982. However, Elkhart did perform better than the state in 1982. Three other SMSAs—Evansville, South Bend, and Terre Haute—also performed worse than the nation but better than the state in 1982. The five hardest-hit SMSAs in the state, as measured by unemployment, were Gary-Hammond-East Chicago, Muncie, Anderson, Fort Wayne, and New Albany. In 1982 these areas had higher average unemployment rates than both the state and nation.

Employment Growth

A second useful indicator of economic performance is employment growth rates—both the total rate and the rate broken into manufacturing and nonmanufacturing sectors, for the state as a whole and for each SMSA. Figure 3 presents the percent change in total employment and employment by sector for the state and each SMSA.

There are two findings from these data. First, the nonmanufacturing sector has grown in the state and in every SMSA; second, manufacturing employment has declined in every area except Lafayette, for which no change in manufacturing employment has occurred. Figure 3 further reveals that total employment grew in eight of the twelve SMSAs. The state as a whole experienced a slight decrease in overall employment. Despite a substantial drop in manufacturing, the increase in the nonmanufacturing sector helped maintain the overall level of employment for the state. This leads some economic planners to argue for a concerted effort by the state to expand its nonmanufacturing sector.

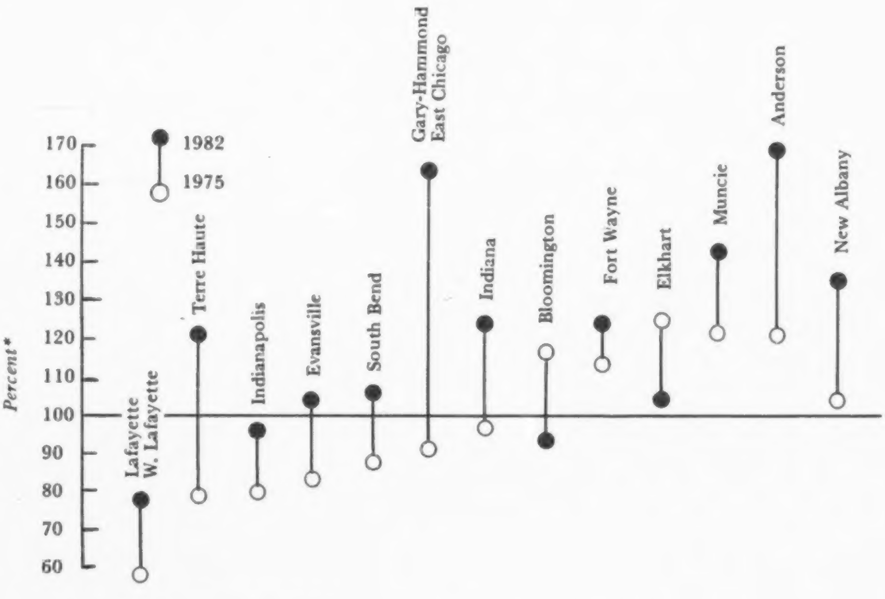
Economic Balance

The length of the line for each area in Figure 3 provides additional information about each metropolitan economy. Gurwitz, in an article in the *Quarterly Review of the Federal Reserve Bank of New York* (Autumn 1983), points out that the length of the line represents the "balance" of economic growth in a particular area. Balance refers to similar growth patterns between the manufacturing and nonmanufacturing sectors. A short line indicates balanced growth while a long line indicates unbalanced growth. Using this criterion, we can see that Lafayette and Evansville have had the most balanced growth between 1976 and 1982. South Bend, Terre Haute, Indianapolis, and Elkhart also have shorter lines than Indiana, thus indicating a relative degree of balance in their economies. With the exception of Elkhart, these areas also had a greater increase in total employment than the state.

At the other extreme, Anderson, Muncie, and Gary-Hammond-East Chicago had a larger "spread" and also a greater decrease in total employment than Indiana. Bloomington, Fort Wayne, and New Albany also had a larger "spread" than the state. However, in these three SMSAs total employment increased between 1976 and 1982. Although the loss in manufacturing had a substantial effect on Fort Wayne's

Figure 2

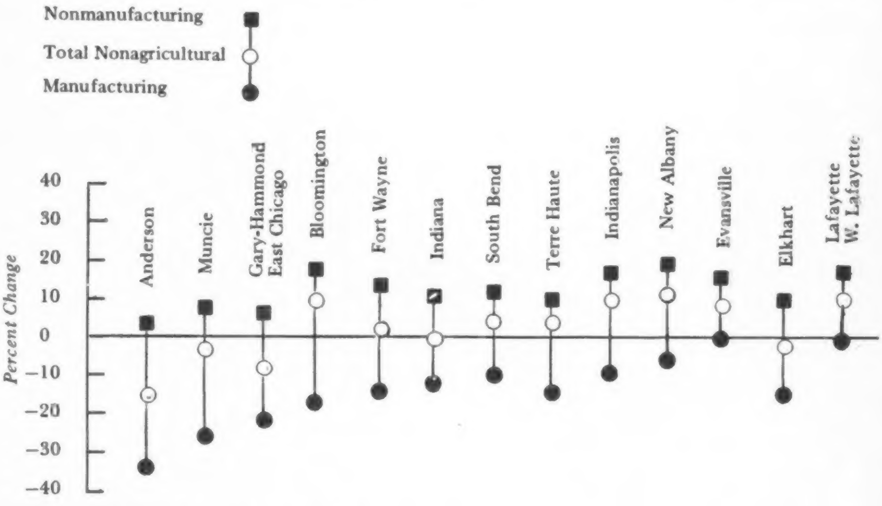
Average Unemployment for Indiana SMSAs Compared with U.S. Average Unemployment, 1975-1982



*Local average unemployment as a percentage of U.S. average unemployment.

Figure 3

Employment Growth Rates in Indiana SMSAs, 1976-1982



Source: Indiana Labor Market Trends

economy, the increase in nonmanufacturing was large enough to give the city a small increase in total growth. New Albany, which had a slight decrease in manufacturing and a substantial increase in nonmanufacturing, experienced the greatest total growth in the state. A plausible explanation for this is the rapid growth in New Albany's labor force due to a spurt in suburban settlement associated with the Louisville-Jeffersonville metropolis. Therefore, even with tremendous growth in total employment, unemployment worsened. Bloomington had the second largest growth in total employment in the state. However, in Bloomington the growth in the labor force was not greater than the growth in employment, as it was in New Albany. Therefore, Bloomington's unemployment rate improved. Bloomington's growth came in spite of a substantial decrease in manufacturing, and was due to an exceptional increase in nonmanufacturing.

In general, the "spread" of each economy correlates with the unemployment data in Figure 2. That is, the more balanced a local economy, the lower the unemployment rate compared to the nation's. The two exceptions to this rule are Terre Haute and Bloomington. Terre Haute experienced relatively balanced growth when compared to the other areas of the state, but its unemployment rate increased substantially from the recession of 1975 to the recession of 1982. Bloomington had "unbalanced" growth but a decrease in unemployment. Five of the six areas with the largest "spreads"—Gary-Hammond-East Chicago, Fort Wayne, Muncie, Anderson and New Albany—were also areas with the highest unemployment rates. That is, unemployment worsened in each area between 1975 and 1982, and each area performed worse than both the state and the nation in 1982. With the exception of New Albany, these SMSAs experienced a substantial drop in manufacturing between 1976 and 1982.

Manufacturing Employment Percentage

Figure 4 reveals that the most stable economies in Indiana generally have a smaller percentage of their employment in manufacturing and a relatively small decline in the percentage of employment in manufacturing between 1976 to 1982. It is interesting to note that Muncie, a "weak" economy by other standards, is similar to the "strong" economies with regard to percentage of employment in manufacturing. However, it has shown a rather significant decrease from 1976 to 1982 in manufacturing as a percentage of total employment. This is similar to the other "weak" economies such as Gary-Hammond-East Chicago and Anderson. In contrast, Elkhart, one of only two SMSAs to experience a drop in unemployment, has a higher percentage of people employed in manufacturing than any other SMSA in the state. A close examination of Elkhart, though, reveals several important factors that may have contributed to its positive performance. First, Elkhart's manufacturing sector is very broadly based. No one particular industry dominates the sector, as the primary metal industry does in Gary-Hammond-East Chicago and the automotive industry does in Anderson. The largest manufacturing industry in Elkhart is transportation equipment (including recreational vehicles). This industry accounts for only about 10 percent of total employment. In addition, Elkhart has a good balance between durable and nondurable goods manufacturing. Second, Elkhart is a high-tech growth area, as reflected in its pharmaceutical industry. Third, some of Elkhart's less technology-intensive industries, such as wood products, are still growing.

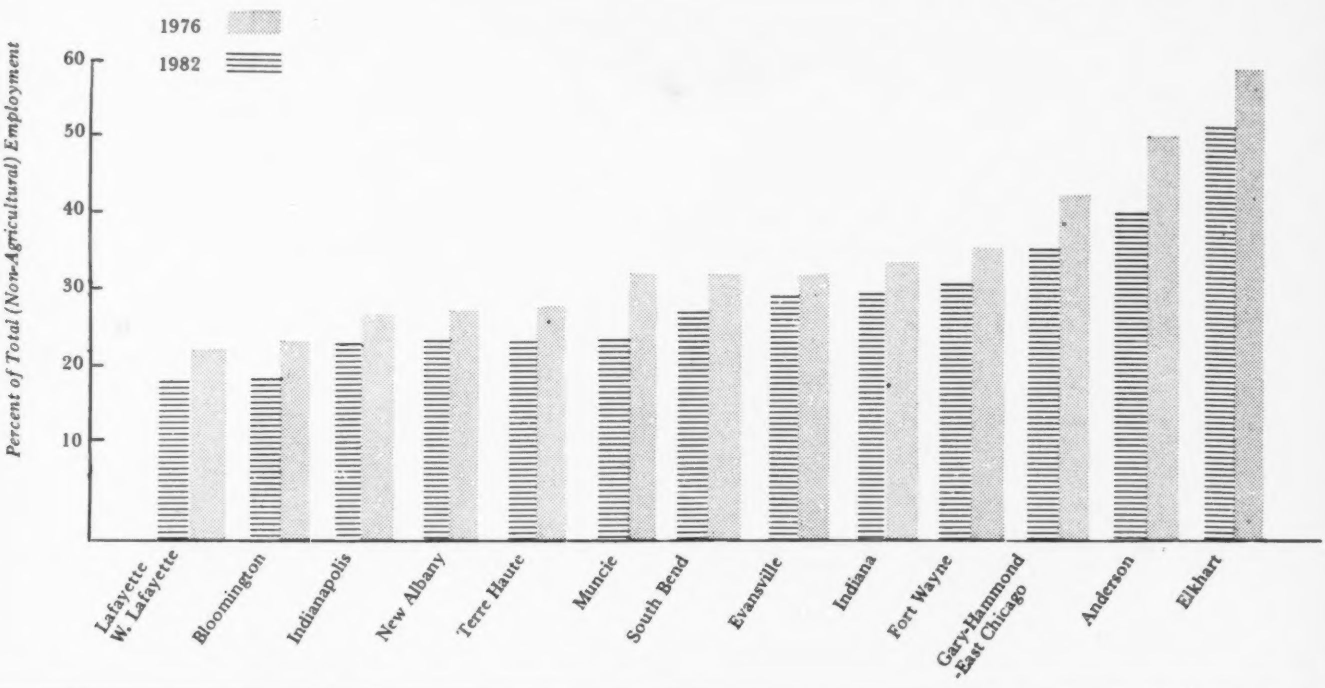
The importance of a diverse manufacturing sector is also illustrated by the three most stable economies in the state. Lafayette, Indianapolis, and Evansville each have a manufacturing sector that is heterogeneous. Further, each has a reasonable balance between the production of durable and nondurable goods.

Conclusion

Much of the conventional wisdom in In-

Figure 4

Manufacturing as a Percentage of Total (Non-Agricultural) Employment, 1976-1982



diana, and in other industrial states, is that the service sector of the economy must be bolstered to ensure economic growth. However, these data suggest that the nonmanufacturing sector is growing without any extra incentives as the U.S. becomes an "information society." This analysis suggests that those areas with the most balanced growth between the manufacturing and nonmanufacturing sectors have the strongest economies. In a branch plant economy, such as in Indiana, loss of the manufacturing base would appear to disrupt its metropolitan economies. Therefore, to promote stable growth, it might be more fruitful to concentrate on the manufacturing sector. This points to the importance of modernizing and automating Indiana's manufacturing base and expanding markets for manufactured goods. Indiana's economic well-being lies in the rapid and sophisticated deployment of high technology to existing manufacturing establishments. The importance of applied research centers, such as CIDMAC at Purdue, and of technology transfer centers, such as the Center for Productivity proposed in the statewide economic development plan, cannot be stressed too much.

However, it must be recognized that manufacturing is an extremely broad category. The type and distribution of manufacturing present in an area contribute significantly to the stability of the economy. Elkhart's performance between 1975 and 1982 demonstrates that a balanced manufacturing economy can survive.

Finally, any statewide economic development strategy must recognize the uniqueness of each of Indiana's metropolitan economies. Uniform strategies universally applied will probably be counterproductive. Each substate region and metropolitan area must be assessed for its strengths and weaknesses, and public initiatives must be selectively applied through joint consultation between local area development groups and the Indiana Department of Commerce. The state is a political unit that can provide tools and reduce barriers so that geographic economic units within state can respond competitively and aggressively to changing economic conditions. ☐

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The Economic Outlook for 1985: Slower Growth But No Recession

R. Jeffery Green

Professor of Economics, Indiana University, Bloomington

In a variety of ways 1984 has been an extraordinary year. It now appears that growth in constant dollar GNP for 1984 will be just under 7%, which would make it the strongest year for economic growth in almost thirty years. The inflation rate for 1984 will likely be under 4% for the second straight year, and that would be the best two-year inflation performance since 1967. The unemployment rate should average about 7.5% for the year; this rate is still quite high but is a full two percentage points below that of 1983. Such a decline has not been achieved since 1951 during the Korean war. The question for next year is: Will the remarkable performance in 1984 be a prelude to a long period of sustained growth or will the recovery stumble in 1985? Our answer is that another year of solid economic growth is likely, but a number of strains are developing which endanger the recovery.

Monetary and fiscal policy could affect economic performance in 1985. Indexation of personal taxes is already in the law so that personal tax rates will fall in 1985 unless Congress passes new legislation. A number of tax simplification proposals are being considered, but so far none imply major changes in total taxes. Rather, these proposals concentrate on generating roughly the same revenues as the existing tax code while eliminating some complexities in the current law. Since it is the overall level of taxation that has the major effect on the outlook, passage of one of these proposals will not be likely to change the outlook significantly. Further, a change in the tax law would be unlikely before the end of next summer, so most effects would be felt in 1986. Consequently, the major fiscal policy story for 1985 is the discussion of tax simplification and tax reform.

Monetary policy is more of a concern and its course is more difficult to predict than fiscal policy. Growth in the monetary aggregates has been within the published target ranges of the Federal Reserve during 1984. However, within the year there is a more disturbing pattern. In mid-November the narrow money supply, M1, was at about the same level as in mid-May. This lack of growth of the money supply may signal a willingness on the part of the Federal Reserve to tighten monetary policy, and that would pose a danger to the recovery; if the period of little or no monetary growth continues much longer, it will put upward pressure on interest rates may be a problem later in 1985. For now, the slower growth in the economy in the last half of 1984 has allowed interest rates to fall. Consequently the forecast is for rates to continue to fall this winter but to move higher later in the year.

Real GNP is expected to grow by 4.1% from the fourth quarter of 1984 to the fourth quarter of 1985. The slow growth in the last half of 1984 is expected to give way to faster growth during 1985, partly as a result of more tax stimulus in 1985 and partly because the slowdown in 1984 was the result of special factors like the auto strike. Another source of strength in 1985 will be an increase in export growth and a reduction in import growth due to an expected decline in the exchange rate on the dollar.

Another lead sector in 1985 will be business spending for plant and equipment. This component of total spending rose 19% in 1984. Although that performance will not be repeated, an 8% increase is forecast for 1985.

The automobile industry should put in another solid year in 1985. Sales are expected to exceed 10 million units again in 1985 and Congress seems likely to continue its protectionist policies, so profits will probably remain strong. Housing starts are also expected to maintain their 1984 level into 1985. The recent decline in interest rates will help housing starts reach the 1.8-million-unit level in 1985. Hence, autos and housing will remain strong in 1985 but will not contribute to growth.

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*This forecast was produced with the assistance of graduate students Catherine Balliet and Hansuk Kim.

In this issue . . .

In keeping with the season, we send our readers the enclosed forecasts for 1985. The messages from our writers across the state may not be excessively ebullient, but the general tone is upbeat, with expectations of more progress for the nation, the state, and our Hoosier communities. After the economic revelries of early 1984 and a touch of business indigestion in late 1984, a more normal pattern for 1985 is welcome.

With this issue we say farewell to Barbara Coffman who has guided manuscripts from authors to printers for these past two years. Her contributions are to be seen in every issue, but no byline or credit has been given. With intelligence and patience she has endured and enriched our efforts. A grateful assemblage of authors salutes her and wishes her well.

MJM

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Another Good Year: A Look Ahead for Indiana

Richard L. Pfister

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The recovery that started in 1983 and came on strong in 1984 will continue to improve the economic health of Indiana in 1985. Although the degree of improvement will not be as great as it was in 1984, this coming year will be a good one.

In 1984, personal income increased by $6.18 billion to $63.58 billion. Nominal income went up 10.8%. Although this percentage increase was less than it was in 1976, 1978, and 1979, when adjusted for inflation, the increase was the largest since 1976 (see **Table 1**). The increase in real personal income in 1984 (7.2%) was especially welcome after several years of small increases or actual decreases. From 1979 to 1983, real income in the state declined by 4.8%.

In 1985, we expect real personal income to increase by 3.8% over the 1984 level. Nominal income will rise by 7.8 percent. The state economy, like the national economy, is forecast to grow more rapidly in the latter half of 1985 following the slowdown in growth in late 1984 and early 1985.

Our forecast for employment in 1985 is that 48,000 jobs will be added. This is fewer than the 54,000 jobs added in 1984, but looks more promising than the figure for the years 1979 to 1983, when employment steadily declined. (See **Table 2**).

The pattern of employment growth in 1985 will be considerably different from the pattern of 1984. In 1984, employment in durable manufactures grew strongly (5.9%) while nonmanufacturing grew slowly (1.6%). In 1985, the situation will be reversed, with durables growing very little

Table 1

Indiana Personal Income, 1976-1985

	Amount	*Change*	*Percent Change*	
Year	*(Billions of dollars)*		*Nominal*	*Real*
1976	33.54	+3.5	+11.5	+6.0
1977	36.97	+3.4	+10.2	+4.2
1978	41.19	+4.2	+11.4	+4.2
1979	45.86	+4.7	+11.3	+2.2
1980	48.93	+3.1	+6.7	−3.2
1981	53.85	+4.9	+10.1	+1.3
1982	54.93	+1.1	+2.0	−3.7
1983	57.40	+2.5	+4.5	+0.8
1984	63.58	+6.2	+10.8	+7.2
1985	68.52	+4.9	+7.8	+3.8

Table 2

Indiana Establishment Employment, 1976-1985

		Change	
Year	*Employment (000s)*	*Number (000s)*	*Percent*
1976	2,024	+82	+4.2
1977	2,114	+90	+4.4
1978	2,205	+91	+4.3
1979	2,236	+29	+1.4
1980	2,129	−107	−4.8
1981	2,114	−15	−0.7
1982	2,028	−86	−4.1
1983	2,007	−21	−1.0
1984	2,061	+54	+2.7
1985	2,109	+48	+2.3

The inflation rate should be low for the third straight year. Wages have been increasing slowly while productivity has been increasing, so unit labor costs will grow only about 1.5% in 1984 and 1.7% in 1985. In addition, the special factors that have pushed inflation higher at times in the past seem not to be a problem now. Neither energy nor food prices seem poised for a sharp increase, and energy prices may even move lower. The only shadow on the inflation horizon is the expected depreciation of the dollar. Depreciation will increase the price of our imports and so raise the inflation rate. However, unless the dollar falls quickly and steeply, the upward effect on the inflation rate should be modest. Taking all these factors into account suggests that an inflation rate of about 4% is probable.

The 4% growth in real GNP expected for next year will be sufficient to provide enough jobs to lower the unemployment rate. Because the largest part of the baby boom generation is already in the workforce, further growth in the number of people looking for work will be slow. We expect the labor force to grow only about 1.3% in 1985 while employment is forecast to grow by 1.8%. As a result, the unemployment rate should fall to about 6.5% by the end of 1985.

Although this forecast does not show spectacular economic performance, it does represent very good news. Now that the recovery which began in late 1982 is two years old, it is important for the economy to move onto a sustainable path of long-term economic growth. It now appears possible to avoid the twin dangers of too much stimulus, leading to inflation, and too much restraint, leading to another recession.

The forecast just outlined represents the most likely course for the economy in 1985, according to the Business Outlook Panel. However, this rosy outlook could be altered by significant changes in three areas: monetary policy, fiscal policy, and the value of the dollar in foreign exchange markets. If monetary policy turns sharply towards restraint, interest rates could move significantly higher, thereby choking off housing and consumer durables expenditures and reducing economic growth considerably. Because decisions about fiscal policy take longer, there is less likelihood that the economy could be hurt seriously in 1985, but if a consensus forms quickly around a massive package of spending cuts and tax increases (perhaps disguised as tax reform), then economic growth might slow in anticipation of the fiscal restraint. Some of this effect might be offset by a decline in interest rates. Finally, if the dollar remains strong, it will be difficult to generate large increases in exports and 1985 will be weaker than forecast.

Thus, the risks to the forecast seem to be mostly on the downside. If our forecast for 1985 is not realized, it is likely the economy will be weaker, rather than stronger, than we had expected. ☐

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*This forecast was produced with the assistance of graduate student Cary Harmon.

and nonmanufacturing growing much more. Since durable manufactures pay higher wages, this reversal in growth patterns for 1985 will mean slower growth in real wages and salaries.

The slowdown in growth of employment in durables stems largely from the flat trend in demand at the national level for autos and housing expected in 1985. The level of demand in these sectors will be high, but is not forecast to grow as it did in 1984. Thus, Indiana will struggle to hold its durable goods employment at the level of the previous year.

The Indiana economy will probably grow at a slower rate in 1985 than the U.S. economy, which is less heavily dependent upon durable manufactures. During the first six quarters of the current recovery, Indiana slightly exceeded the U.S. growth rate for total employment and only slightly trailed the U.S. rate for real personal income.

Table 3 shows rates of growth for different measures of economic activity during the first six quarters of recovery in 1983-84 and during 1976-76. Real personal income has increased more in the current recovery than it did in 1975-76 (9.4 compared to 8.0%). Real wages and salaries have also grown more vigorously in the current recovery. Establishment employment grew a little less rapidly than in the earlier recovery (6.6 versus 7.0%), but the recent recovery showed stronger growth in manufacturing employment, especially in durables. Nonmanufacturing employment grew more rapidly in the 1975-76 recovery (7.2 compared to 4.9%).

Table 3

The First Six Quarters of the Recovery in Indiana 1975:1 to 1976:3 Compared to 1983:1 to 1984:3

	Percentage Change	
Variable	*1976:3 / 1975:1*	*1984:3 / 1983:1*
Real Personal Income	8.0	9.4
Real Wages and Salaries	7.7	10.6
Establishment Employment	7.0	6.6
Manufacturing	6.5	11.5
Durables	6.7	12.3
Nondurables	5.6	9.5
Nonmanufacturing	7.2	4.9

Although the current recovery looks pretty good on the basis of the numbers in Table 3, the economy has not returned to the peak levels of 1979, which may indicate slippage or a permanent loss of national share by the Indiana economy. For the time being, though, we can look forward to the good year we see ahead. ☐

Indianapolis

Robert J. Kirk

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During 1984, the Indianapolis metropolitan area economy expanded at approximately a 4% employment (establishment) growth rate and will continue to expand during 1985, but at a reduced rate of 2.5-3%. Indianapolis contributed to the statewide expansion of jobs in 1984 by creating more than would be expected, based on its share of state employment. When comparing Indianapolis with other metropolitan areas in the Midwest, such as St. Louis, Chicago, Detroit, Columbus, Cincinnati, and Louisville, Indianapolis has done especially well in two sectors—finance, insurance and real estate (FIRE), and services. The primary contributors in FIRE were insurance carriers and agents, and real estate. In services, business and health services were the major contributors.

Cost-control

For business managers a primary concern is the control of costs. In goods-producing industries the need to control costs is based on competition, nationally and internationally. Cost control with respect to labor is expressed by the reorganization of work and the substitution of capital for labor. Managers examine very carefully the decision to add employees. Little additional employment increase is anticipated from goods-producing industries, such as autos and electrical machinery. In addition, with the final phaseout of Western Electric during 1985, 1,300 workers will no longer be receiving a paycheck. The instruments industry, once targeted for attention in local economic development strategies, has contracted in employment during the 1984 recovery.

One way management can control costs is to contract out the task to a specialized firm. Many of these firms appear in the business services industry—an industry which has shown significant employment gains, as mentioned above, and is forecasted to show continued gains in 1985. Business services include employment agencies, data processing, management consulting, and leasing services. The Indianapolis market is large enough for these specialized firms to achieve economies of scale and to pass the economies on to their customers at a lower price and higher quality of service than the customer could get performing the task internally.

One consequence of the employment increase in services is an increase in the demand for office space. Two-thirds of the downtown office space is used by the finance and services industries. Industry estimates suggest the annual absorption rate of class A space is about 200,000-250,000 square feet. With the completion of two downtown office buildings and the vacant space in existing buildings, the available space will rise to more than 700,000 square feet. The city hopes that Indianapolis' national image, enhanced by economic performance and media coverage, will convince local firms and firms from outside the area that Indianapolis is an attractive location.

One might think that with the many new buildings downtown the tax base would be increased. However, the assessed valuation of building improvements in Center Township has declined in recent years. Two reasons are suggested: 1) many structures have been removed from the property tax rolls through demolition or acquisition by the city; and 2) several of the new structures received property tax abatement, which means that the full impact on assessed valuation will not be felt for a few years. In the meantime, the property tax rate has increased.

One area of employment expansion in the services industry is health services. New hospitals will be completed in Indianapolis in 1985. However, although there will be some additional employment, acute-care hospitals are not expected to be the sources of employment growth in the 1980s as they were in the 1970s. Other new forms of health care delivery systems are expected to contribute to increased employment. Nationwide, the age groups of our population that are expanding at a high percentage rate are 0-4 and 75 and over—two groups with a higher-than-average need for health care services.

Housing

The demand for housing depends on household real income, mortgage rates, and household formation. During the 1980s the rate of formation has decreased nationally compared to the 1970s. In fact, the number of households headed by persons under the age of 35 has declined. From an economic perspective the slowdown in household formation may have reflected the recession, as young adults moved back to live with their parents, the divorce rate stabilized, and marriage was postponed. As the recovery progresses, the trend may be reversed, causing new household formation and promoting demand for housing. Combined with a lowering of mortgage rates and increases in real household incomes, housing may be sustained at the 1984 level.

The willingness to supply housing in 1985 is dampened by the fact that during 1984 the average sale price of existing housing remained constant. In the 1970s households used the appreciation in housing prices to move up to more expensive housing. In the 1980s this source of stimulation has not existed. How has housing construction in Indianapolis compared to other metropolitan areas during the recovery? Using permits issued as an indicator of housing activity, for every 1,000 persons in U.S. metropolitan areas, permits for 13.9 units were issued from November 1982 to July 1984; in Indianapolis the corresponding number was 8.1 units.

Income Distribution

As the composition of employment changes, there is an impact on income distribution. A person is counted as employed if he or she works one hour or more during the reference week. Many jobs have been created in the retail industry (such as restaurants) where the average number of hours worked per week is 30, and in the services industry where the average number is 32. On the other hand, jobs have been lost in the durable goods-producing industries where the average number of hours worked is 40. In addition, there are hourly rate differentials among these industries. An accurate reading of the changing nature of the economy must give attention not only to total employment change but to the average weekly hours and the average hourly rate.

In the product life cycle approach to economic development, cities have been the location of invention and innovation. New ventures need access to the supportive services and technical knowhow found in cities. As the production process of the new venture becomes routinized, the location of production may shift out of the urban area to lower-cost labor areas, while corporate decision-making remains in the urban area. To hold employment in the urban area, management and labor must work together to increase worker productivity. In addition to the creation of new goods and services, cities also develop through important substitution—producing goods locally that previously were produced elsewhere and/or imported. As Indianapolis increases in population and achieves threshold levels, development strategists must attempt to identify those goods produced elsewhere that can be produced locally at competitive costs and prices. □

Richmond

Ashton I. Vermallay

Director of the Center for Economic Education at Indiana University East

The Richmond area economy can expect

continued growth in the coming year. It will be slow and steady as the pace of the national economic expansion declines, meaning that employment, income, and output will not increase as rapidly as they did a year ago. The massive layoffs, reminiscent of the 1981-82 recession, in both manufacturing and non-manufacturing enterprises will not be repeated in the slowdown phase. Consequently, unemployment in Wayne County will hover in the 8 to 10% range unless it is offset by a major expansion of existing businesses and/or the location of large job-creating businesses.

A note of concern is in order here. About 70% of the respondents to a survey thought that Richmond was on an industrial decline. Some of the factors they cited for this phenomenon involve labor-management relations, infrastructural facilities, diversification, intra- and inter-state competition, foreign competition, retailing and the job market.

Despite this concern, business confidence is still upbeat. About 94% of the respondents are optimistic about business conditions in 1984, and 74% rate President Reagan's economic program favorably. However, they temper this optimism with concern about the continuing rise in the federal budget deficits, which partly sustains the current high rates of real interest. About 57% of the respondents are in favor of a constitutional amendment to balance the federal budget.

When interest rates are high, firms tend to decrease their investment in plants and equipment, and consumers tend to buy fewer durable goods such as automobiles, houses, appliances, furniture, televisions and computers. These, in turn, adversely affect the local economy's employment, income, and output.

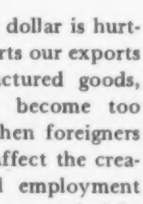
Consumer confidence, on the other hand, is relatively stable. Many consumers are now financially well-off because of the combined effects of lower taxes and moderate inflation. The misery index (the combination of inflation and unemployment) is now half of what it was four years ago. This, along with the expected 5% increase in Indiana's real personal income, will enable consumers to keep on buying big-ticket items.

Local retailers can therefore expect a very favorable fourth quarter this year, but not as robust as last year. In fact, consumption spending will ultimately dictate the growth in local gross income as the disinflation psychology among consumers continues.

Furthermore, the strong dollar is hurting the local economy. It hurts our exports of agricultural and manufactured goods, because our goods simply become too expensive for foreigners. When foreigners cannot buy from us, they affect the creation of local and national employment opportunities, because one in every six jobs is related to the international sector. It is also important to note that a significant proportion of the goods and services which are produced in Richmond are subject to foreign competition, and the strong dollar clearly promotes import penetration, which is now evident in the growing trade deficit.

In summary, I predict a very favorable fourth quarter and slow and steady growth in the local economy during 1985 as the national expansion slows. □

Terre Haute



Marvin Fischbaum

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Each week, the first page of *Standard and Poor's Outlook* contains a paragraph that forecasts the direction of stock prices. Flip through the pages of any volume of the *Outlook*. Predictions near the front correspond remarkably to the actual direction of prices further back. However, it is the most recent issue that is filed in front; when read chronologically the forecasts have little predictive value. That some forecasts may be worthless should come as no surprise to careful readers of the regional report for Terre Haute. Readers of other *IBR* reports may take issue with the theory of efficient markets that maintains forecasts are worth, at most, what one pays for them. Perhaps there is a free lunch!

Twelve months ago it was written that through 1984, Terre Haute, in spite of structural weakness, would be pulled forward by a broadening national recovery. One may envy the editors of the S&P *Outlook*; they at least know how badly they guessed. The Terre Haute area economy clearly improved in 1984, but the degree of improvement remains uncertain. One can point to evidence that indicates grudging recovery—net loans and discounts from Vigo County banks fell in the first six months of 1984. One can point to evidence that indicates explosive advancement—the unadjusted unemployment rate fell from 14.4% in January to 7.2% in September.

Local labor market conditions are estimated from two distinct surveys. The unemployment estimate is derived from a residence-based household survey; establishment employment is based on monthly reports of cooperating firms, and measures how many work in a defined area, rather than how many in a defined area work. From September 1983 to April 1984 the two series tracked closely and, allowing for seasonal factors, pointed to distinctly improving conditions. Since April, establishment employment leveled off, leading to a modest 3% growth over twelve months, while the household survey recorded continued improvement, leading to 7% growth on a year to year basis. The unemployment rate, which is derived from the household survey, fell from 10.1% to 7.2% in the course of the year. Establishment employment data reveal that employment gains were concentrated in retailing and services, so that high wage manufacturing and construction jobs lost during the recession have been replaced, if at all, with jobs in low wage sectors.

Indicators of construction activity provide similar ambiguities. The value of residential building permits for the twelve months ending August 1984 was up 30%

over the same interval for the previous year. However, comparing April to August 1984 to the same six months of 1983 shows an increase of 13%. The F.W. Dodge reports for construction contracts indicate a 66% increase in residential activity for the first nine months of the year over the corresponding period in 1983. For nonresidential construction F.W. Dodge reports an 83% increase. The Commerce Department report on non-residential building permits has a problem with its data—it shows virtually no nonresidential construction permits issued in 1984. Casual inspection of the records in Vigo County fails to confirm either an upsurge or a downtrend in new nonresidential building permits. Permits were issued in the past six months for a new $2,200,000 home for Applied Computer Devices, a $1,100,000 Super 8 Lodge, Phase II of Maryvale Apartments, and new offices and expanded plant for MAB Paints.

Nonresidential construction should pick up in 1985. Announced projects include: downtown office buildings for Terre Haute First National Bank and Terre Haute Water Company; a branch of Carbonic Industries, to bottle the carbon dioxide byproduct of CF Industries; a home for the Patterson Equipment Company to produce conveyor belts; and Sony's video laser disk operation.

Three changes in the ownership of local industries increase the degree of uncertainty for 1985. B.F. Goodrich bought the CBS vinyl compounding plant and intends to modernize and expand it. Alcan acquired most of the Annaconda Aluminum Division of Arco, including the Terre Haute plant. Alcan is the low cost producer of primary aluminum, which bodes well for downstream facilities; but the industry is still plagued with over-capacity. Tenneco intends to acquire International Harvester and merge it with its J.I. Case subsidiary. The farm equipment industry makes aluminum look great—the local Case plant will be closed the first quarter of 1985 for inventory reduction.

The economic outlook for Terre Haute in 1985? Uncertain—most uncertain. ☐

South Bend-Elkhart

John E. Peck

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The economies of South Bend and Elkhart continue to reflect the positive economic conditions that have characterized a continuing national recovery in 1984. Although there has been a recent slowing in the rate of recovery both locally and nationally, it is clear that 1984 is this area's best year so far in the 1980s. Indicators suggest that activity in South Bend has been nearly returned to the pre-recession levels of 1978 and 1979. The Elkhart record is even brighter. Data now suggest that Elkhart's recovery was accomplished by the fall of 1983, and that 1984 will be remembered as a year of substantial growth.

Table 1 summarizes these various indicators of economic activity for the South Bend and Elkhart communities. The figures contained in the table are seasonally adjusted and, with the exception of the unemployment rates and real estate data, are index numbers expressed as a percentage of 1967 base year values. In the table, comparative index numbers are given for July and August 1984. Index numbers are also given for an August 1984 to August 1983 comparison.

South Bend

As can be noted in Table 1, the majority of South Bend indicators are positive, and the employment figures are particularly encouraging. Employment has been rising for the past several months, and the current indicators are only a few index points away from pre-recession levels. Virtually every sector of the workforce has contributed. The 10.4% rise in manufacturing employment from August 1983 to August 1984 is especially encouraging—even with the indicator resting at 17 percentage points below the 1967 base year value—since the recent recession had combined with a longer-term community-wide manufacturing decline to substantially reduce manufacturing employment. The building permit indicator, while down in the latter months of the summer (as it was nationally), has hovered around near-normal levels for the past 18 months, a welcome improvement over depressed conditions of recent years.

With respect to a South Bend outlook, the apparent consensus for a good 1985 national outlook is significant, given that a strong national economy is critical to continued recovery and growth in South Bend. The exceptionally bright outlook for business fixed investment is particularly good news, since a good-sized proportion of manufacturing employment in South Bend is in capital goods production. While economic development efforts continue to produce results in the job market, recent announcements by AM General and Bendix of possible layoffs and plant closings have dampened the community's spirits at year's end (AM General is completing certain of its defense contracts and Bendix is moving chassis and brake work to Brazil). It is expected that overall employment will continue to increase in 1985, though only moderately in the 1 to 2% range.

Elkhart

Elkhart's record in 1984 has been truly outstanding. While fewer indicators are available for analysis than in South Bend, employment data suggest that the Elkhart economy regained pre-recession strength in late 1983 and has continued to grow in the months since. As indicated in Table 1, manufacturing employment rose 10.6% from August 1983 to August 1984, and the index is presently 59% above base year levels. More than 50% of Elkhart's workforce is employed in manufacturing. The unemployment rate in Elkhart County was consistently recorded as one of the lowest in the state throughout all of 1984. As in South Bend and the nation, housing activity declined in the late summer. On balance, however, housing and commercial construction have been strong features in

Elkhart's recent recovery and growth.

The Elkhart outlook is clouded by certain market conditions in the recreational vehicle industry. Over 20% of Elkhart's workforce is directly or indirectly employed in the RV industry, where shipments have increased each year over the past four years. Industry analysts now expect a consolidation, thought to have been started in mid-1984, to continue through 1985 and into early 1986, with shipments falling as much as 16% in 1985. Shipments have, in fact, softened noticeably since the early months of the past summer. The feeling here is that if interest rates continue to moderate as they have in recent weeks and do not rise sharply in 1985, the RV outlook is likely to be brighter than the analysts presently suggest, since RV demand is known to be interest rate sensitive at both the dealer and consumer level. Overall, we expect the RV situation to bring about a leveling off of recent employment gains in the Elkhart economy. Growth in the 0 to 2% range by this time next year seems to be a reasonable projection. ☐

Kokomo-Marion-Peru-Logansport

Dilip Pendse

Associate Professor of Economics, Indiana University-Kokomo

The numbers are in and the verdict is out. The current economic recovery is one of the strongest in mid-north Indiana's recent past! Good times are here and people are happy about it.

Economic Indicators—South Bend and Elkhart[1]

	South Bend					Elkhart				
				Percent change from:					*Percent change from:*	
	August 1984	*July 1984*	*August 1983*	*July 1984-August 1984*	*August 1983-August 1984*	*August 1984*	*July 1984*	*August 1983*	*July 1984-August 1984*	*August 1983-August 1984*
Employment Data										
Establishment Employment										
Nonagricultural Employment	118.6	117.6	111.3	.9%	6.6%	167.7	167.1	154.2	.4%	8.8%
Manufacturing Employment	83.1	81.7	75.3	1.7%	10.4%	159.0	158.9	143.8	.1%	10.6%
Nonmanufact. Employment	131.7	141.2	134.6	.4%	5.3%	291.4	289.0	272.4	.8%	7.0%
Unemployment Rate	6.3	7.4	7.7	n/app	n/app	6.0	6.2	6.0	n/app	n/app
Help Wanted Advertising	80.1	102.7	70.3	−22.0%	13.9%	–	–	–	–	–
Utilities										
Industrial Electricity Sales	135.1	128.1	127.3	5.5%	6.1%	195.6	193.4	188.4	1.1%	3.8%
Commercial Gas Sales	144.2	141.2	131.5	2.1%	9.7%	156.9	166.4	160.7	−5.7%	−2.4%
Industrial Gas Sales	71.9	76.8	72.2	−6.4%	−.4%	278.3	289.2	257.4	−3.8%	8.1%
Retail Car and Truck Sales										
New Passenger Car Sales	89.7	125.8	67.4	−28.7%	33.1%	–	–	–	–	–
New Truck Sales	174.7	261.8	158.3	−33.3%	10.4%	–	–	–	–	–
Housing Construction Data[2]										
Estimated Value of Permits	287.6	350.2	255.7	−17.9%	12.5%	213.4	283.0	217.0	−24.6%	−1.7%
Number of Permits Issued	79.2	90.7	82.1	−12.7%	−3.5%	68.9	104.3	81.8	−33.9%	−15.8%
Average Value Per Permit	401.6	421.9	348.2	−4.8%	15.3%	331.4	272.6	288.6	21.6%	14.8%
Residential Real Estate Data[3]										
Number of Active Listings	1533	1586	1752	−3.3%	−12.5%	1361	1377	1181	−1.2%	15.2%
Closed Sales										
Average Days Listed	87	84	70	3.6%	24.3%	112	117	135	−4.3%	−17.0%
Average Market Price	$48,276	$48,220	$49,072	.1%	−1.6%	$48,631	$48,377	$49,399	.5%	−1.6%
Percent of Sale to List Price	94.0	92.3	93.9	1.8%	.1%	95.0	95.0	93.5	.0%	1.6%

1. Index numbers are seasonally adjusted; 1967 = 100.
2. All Elkhart construction data has a base year of 1970.
3. Real estate data are not index numbers but are unadjusted weekly averages.

People of Kokomo, Marion, Peru, and Logansport have many reasons to be happy about their economies. First and foremost, the jobless rates have declined sharply. Unemployment rates have dropped more sharply and further than they did during the recovery period following the 1973-75 recession. In September of this year, the unemployment rates ranged from a low of 5.7% in Kokomo to a high of 7.9% in Marion. Since January 1984, unemployment rates have varied from a low of 2.4% in Kokomo to a high of 7% in Logansport. Unlike the past, these declines have occured in conjunction with an increasing labor force; in September, there were 3,600 more people in the labor force in the Kokomo-Marion-Logansport-Peru area than there were at the beginning of the year. This trend suggests that people are moving back to the area.

Second, because of worker recalls and new jobs, the average income is on the rise. In 1983, the average annual pay for covered workers in Kokomo was $20,898, the eleventh highest in the nation and the highest in the state. Also, during 1982-83, the average annual pay in Kokomo registered a hefty 13.1% gain, the highest percentage gain in the nation. Kokomo has also moved up in the *Sales and Marketing Management* magazine's ranking of metropolitan areas. For example, Kokomo's rank edged upward from 177th in 1982 to 130th in 1983 in terms of the median household effective buying income.

Third, on account of better economic conditions, the business sector is enjoying one of its best years. During the first six months of this year, the volume of business in the Kokomo-Marion-Peru-Logansport area totaled $2.1 billion, up 17% from the same period a year ago. Sales of used and new automobiles jumped to $143 million, up 35% from 1983. Also, eating and drinking establishments, liquor stores, jewelry stores, gasoline service stations, and furniture and appliance stores registered sharp increases in sales during the January-to-June period, compared with the same period in 1983.

Fourth, local economies were bolstered not only by the arrival of new industries, but also by new capital projects. For example, Terradyne, a manufacturer of testing equipment for the electronics industry, and Dayton T. Brown, a New York based firm specializing in engineering and testing for advanced technologies, opened their operations in Kokomo. While two firms in Kokomo, Hewitt Tool and Dye Co. and LMC Molding, announced their expansion plans, another firm, Midwest Plating, moved back to Kokomo from Logansport. Tipton's gain of three small high-tech firms also means more jobs in the area. In addition, Evansville's Diamond Institutional Distributions announced plans to operate their business in Kokomo.

Among the capital expenditure programs that would improve the job outlook and make the area attractive to other industries include: the establishment of a 140-acre high-tech park in Kokomo; Congressional approval of a $10 million budget for construction and other projects at the Grissom Air Force Base; and Delco's plan to build a $37 million electronic technology center in Kokomo.

Finally, the housing sector remained quite active in the area. During the first nine months of 1984, Kokomo's lending institutions closed 666 home mortgage and home improvement loans valued at $23.2 million, compared with 581 loans valued at $22.4 million during the same period a year ago. Although the number of home mortgage loans closed climbed 15%, their dollar amount registered very small gains. At the same time, the number of home improvement loans closed between January and September of this year remained 30% below the number posted during the same period in 1983.

The number of building permits issued in the Kokomo area (city and county) rose 9% during the first ten months of 1984. Also, in the Logansport area (city and county) the number of building permits issued rose 8% during the same period. Most notably, the Kokomo area registered a surge in office construction/renovation, church construction/expansion, multi-unit housing, and single family home construction. The number of permits issued for office construction/remodeling in the Kokomo area climbed 52% from January to October of this year.

Looking Ahead

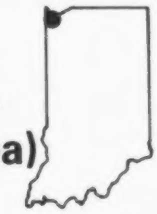
Mid-north Indiana's economy is largely influenced by the national trends in general, and the durable goods sector in particular. Both are expected to post gains next year.

Looking ahead, additional but slower economic growth is expected in 1985 in the Kokomo-Marion-Peru-Logansport area. In Kokomo, the jobless rate could drop as low as 4.5%. In the Marion, Logansport, and Peru areas, however, the rate would hover around 6%. The odds are heavily against the rates going into double digits. The dollar volume of economic activity will likely register a 7 to 10% gain in 1985. Home purchase, home construction, and home improvement activities will level off or decline slightly next year.

Bolstering the case for more good times next year are the views of the 83 (out of 273) business executives from Kokomo, Marion, and Logansport who participated in the economic outlook survey I conducted in September and October of this year. An overwhelming 80% of respondents think business conditions in their areas will remain at the 1984 levels or will improve in 1985. Similarly, 86% of respondents indicated that the employment situation in their own plants would either remain unchanged or improve in 1985. A majority of executives think the inflation rate will stay under 5% in 1985.

In sum, the good times will roll on for one more year. An impressive turnaround in the economy in 1984 and the prospects for another good year should make the people of Kokomo, Marion, Logansport, Peru sing "Happy Days Are Here Again." ☐

Gary-Hammond-East Chicago (Calumet Area)



Leslie P. Singer

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In literature we have a play entitled *Six Characters in Search of an Author*; here in northwest Indiana, we have two counties in search of a recovery. In each of the five years since 1979, total establishment employment in Lake and Porter Counties has declined.

From the fourth quarter of 1982 to the second quarter of 1984, the nation's employment advanced 5.7% and the state's 2.4%. Employment in the four neighboring states—Illinois, Iowa, Michigan, and Wisconsin—advanced 2.5%. In the same period, Lake and Porter Counties lost 22,900 jobs; that is, employment declined 9.699%.

Much of the problem is due to the region's heavy concentration in manufacturing. Consider the following. From the cyclical peak of the fourth quarter of 1969 to the second quarter of 1984, total employment in the U.S. increased 32.1%. In those fourteen and one-half years, however, U.S. manufacturing employment decreased by 2.7%. Manufacturing employment in Indiana dropped 18.8%. In Illinois, manufacturing employment decreased by 29.7%, and in the four neighboring states manufacturing was 20.5% below the 1969 level. Leading the decline were two northwest Indiana counties, where manufacturing employment dropped 31.3%.

It appears that here in northwest Indiana not only are we sharing with the nation, the region, and the state the long-run downtrend in manufacturing, but we also have the distinction of declining further than anyone else.

The weakness of the steel industry is, of course, part of the problem. To better understand the situation let us take a closer look at our own resident company, Inland Steel. The company lost money in 1982 and 1983 and will probably lose money in 1984; third-quarter losses were $36.8 million.

The company produced 5.2 million raw tons with 31,005 employees in 1982 and produced 6.3 million tons with 28,700 employees in 1983. Was this a giant leap in efficiency? Hardly. Output per employee was higher in seven of the previous eight years, including the recession year of 1974. The 1983 output per employee of 219.5 tons was far below the 1978 level of 238 tons per employee.

What about new capital? Inland is completing a third continuous caster which will be put on-line in 1986. But other capital improvements are lagging. Net investment in Inland has declined each year from the peak of $298.4 millions in 1976. Moreover, in each of the years when capital expenditures were lower than they were in 1976, Inland's long-term debt was rising and has almost doubled in the last five years.

All of this is water over the dam. What are the prospects for the future? Local steel shipments have edged up from 381,000 tons per month in 1984, that is, about 10%. That is not enough. For 1985 to begin a recovery phase in steel production, an increase of 16.91% is required. Is this in the cards?

Consider that new orders for capital goods, which showed a regional annual rise of 10.6% in May 1984, receded to a 9.0% annual rate in September. We forecast a further drop to about a 4.8% annual rate in 1985. Consumer durable sales in the region rose at a 5.6% rate in 1984; we expect a slowdown to a rate of about 1.8%. Autos, which did nicely in 1984, rising about 8% over 1983, will show no gain over 1984 in

Table 1

Employment Annual Rates (in thousands)

	1973	*1979*	*1983*	*1984 Q1*	*1984 Q2*	*1984 Q3*	*1984 Q4*	*1985 Q1*	*1985 Q2*	*1985 Q3*	*1985 Q4*
Unemployment (%)	4.8	6.7	15.5	13.7	13.4	13.9	13.1	13.0	13.2	13.1	12.8
Total Payroll	236.2	267.8	216.0	212.8	213.2	207.9	208.1	207.4	207.0	207.4	208.8
Manufacturing	107.5	103.8	70.1	67.3	66.8	60.1	61.4	60.9	60.8	62.1	61.9
Steel Mills	67.5	66.6	48.5	46.0	45.1	38.6	39.1	39.1	40.1	40.0	40.9
Nonmanufacturing	128.7	164.0	145.9	145.4	146.3	147.8	149.0	148.5	148.9	148.9	148.9
Health	9.4	14.6	18.1	17.8	17.9	17.8	17.6	17.7	17.6	17.4	17.0
Education	15.9	16.5 (1980) 17.6	16.3	17.1	15.8	16.2	16.2	16.4	16.6	16.6	16.8
Government	28.6	30.7	31.0	30.3	29.6	29.5	29.8	29.6	29.5	29.2	29.1

Table 2

Income and Payrolls in Billions of Dollars: Annual Rates

	March 1984	*June 1984*	*Sept. 1984*	*Dec. 1984*	*March 1985*	*June 1985*	*Sept. 1985*	*Dec. 1985*
Personal Income	6.934	7.093	7.234	7.247	7.398	7.421	7.502	7.511
Export Sectors Payroll	2.208	2.289	2.071	2.428	2.503	2.504	2.531	2.634
Steel Payroll	1.404	1.419	1.199	1.231	1.301	1.309	1.302	1.329
Private Domestic Sector Payroll	1.963	2.041	2.038	2.047	2.194	2.175	2.179	2.182
Index of Business Activity May 1979 = 100	91.3	93.2	93.4	93.6	94.9	97.8	95.5	97.2

1985 and may even show a small decline. Home sales may rise about 2% if interest rates continue to decline.

In a deflationary world, prices cannot be pushed up. Local steel prices advanced only 2.39% in 1984, less than most industrial products and less than wages.

Assuming that the principal demand sectors for local steel will be weakening in 1985, and that capital formation will occur in industries which consume only moderate quantities of steel, and that foreign steel and mini mills will satisfy a large share of the demand in the capital goods market, we present the forecast summarized in Tables 1 and 2.

What scenario could alter the forecast? A 5.53% increase in productivity or a 9.48% reduction in employee costs would make local steel marginally profitable. This might induce more plant modernization. By 1987, we expect a large national program of rebuilding our decaying infrastructure which could induce a new upswing in the regional economy and more optimistic forecasts in the future. ☐

Lafayette

William C. Dunkelberg, *Associate Professor of Economics, Purdue University*

Jeff Van Hulle, *Graduate Student in Economics, Purdue University*

Dorothy Mansfield, *Labor Market Analyst, Indiana Employment Security Division*

Overall, 1984 has been an excellent year for the Greater Lafayette Area. Employment gains have been substantial, sales have been strong, and the prosperity that swept most of the country made itself felt in our local economy.

In order to collect specific data on the economic upsurge in our area, we sent out 100 questionnaires to a random sample of firms drawn from the membership list of the Chamber of Commerce. Of these, 59 were returned.*

Employment

Most important in the outlook are the prospects for employment and income earned to support the local economy. Here, the outlook appears to be excellent. Forty-one percent of the firms planned to increase employment by an average of 16 employees per firm. Some 11% of the firms planned employment reductions, averaging 44 employees per firm. One firm is planning to close, eliminating about 250 jobs. On balance, however, the data suggest that overall employment will increase an average of 1.9 employees per firm in the Greater Lafayette Area over the next twelve months or so.

Employment has improved substantially since the recovery started; it is up by 4,000 since January 1983. (The bottom of the recession is officially November 1982.) Construction has still shown few signs of life, and manufacturing employment has not recovered from the plant closings in 1979 and other cutbacks in employment. On the bright side, a new high-tech employer is relocating here and may employ upwards of 500 people. Employment gains related to high-tech activities have been strong, as have gains in the services sector. In fact, employment gains in the services sector have offset substantial losses in other sectors, leaving total employment only 700 short of the 1979 peak.

Employment Trends

Industry	*1979*	*Jan. 1983*	*Jan. 1984*	*Sept. 1984*
Manufacturing	12,900	9,900	10,800	11,400
Construction	2,700	1,400	1,200	1,600
Transportation	1,600	1,700	1,700	1,800
Whsle/Retail	12,000	11,300	11,800	11,900
Services	9,200	9,100	9,400	9,900
Government	2,600	2,200	2,300	2,500
Education	17,600	17,500	17,600	17,900
Finance	2,900	2,500	2,500	2,600
Total	**60,300**	**55,600**	**57,300**	**59,600**
Payroll (in 000's)		**92,062**	**212,016**	

Employment Plans

	Percent	*Employees*
Increase	41%	16
Decrease	11%	44
No Change	48%	–
Net Change	**100%**	**+1.89 employees per firm**

Sales

Employees will be needed to meet anticipated increases in sales averaging 9.9% per firm. Seven percent of all firms expected sales increases averaging 17%, while only 5% expected sales declines (all in real terms).

Expected Real Sales

	Percent	*Percent Change*
Higher	70%	17%
Lower	5%	37%
No Change	25%	–
Net Change	**100%**	**9.9% increase**

Past Sales

Certainly, past sales performances have been excellent. The retail sector has experienced a particularly strong increase in sales during the past year, and prospects are for another good year. There is nothing to prevent an excellent Christmas season; the fact that there are more jobs and incomes, stable prices, falling interest rates, and a general optimism among consumers should show up in the cash registers.

Past Sales

	Percent	*Percent Change*
Higher	54%	18%
Lower	18%	9%
No Change	28%	
Net Change	**100%**	**8% increase**

**The authors would like to thank all those firms that participated in the survey. Your contribution to the quality of these results is greatly appreciated. Of course, all data are strictly confidential and all respondents are anonymous.*

Profits

Nearly half (46%) of the responding firms reported that profits were higher, providing the funds to finance capital outlays and pay off debts incurred during the recession. Some firms (14%) reported recent earnings declines, but most are down from very high 1983 profit levels. Overall, the picture is very encouraging.

Change in Profits

Profits	*Percent of Firms*
Higher	46%
Same	36%
Lower	14%
No Answer	4%

Planned Capital Outlays

Nearly 60% of the firms planned to make some type of capital expenditure during the next three months. Eighteen percent plan new capacity additions, 20% plan to upgrade existing physical plant, and 41% will invest in new equipment and vehicles.

Capital Outlays

Type of Outlay	*Percent*
New Structures	18%
Repairs and Expansion	20%
Equipment, Vehicles	41%
Other	5%
Overall Plans	**59%**

Most Important Problems

The most frequently cited "major problem" was competition. Two percent cited "foreign competition." Competition has kept inflation low, and most firms reported improved profits in spite of it. Interest rates received the second highest number of votes in the contest, with 21% citing this as the major problem for small business. Weak sales remain a problem for a substantial number of firms, but this problem received fewer votes than "labor costs," which may begin rising as labor markets get tighter at this point in the recovery. Overall, this would not seem to be a problem for firms in this area, as there is little evidence of a labor shortage.

Most Important Problems	
Weak Sales	14%
Labor Costs	16%
Skilled Labor Shortage	2%
Interest Rates/Credit	21%
Inflation/Rising Costs	5%
Regulation	11%
Taxes	4%
Competition	23%
Foreign Competition	2%
No Answer	2%
Total	**100%**

Overall Outlook

The outlook for 1985 is excellent. Although growth will not be as strong as it was in 1984, the prosperity will be more broad-based, with more firms participating in the recovery. Employment will continue to grow, supporting continued good times. ☐

Fort Wayne

Thomas L. Guthrie

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Employment in the Fort Wayne area* is forecast to increase by 2 to 3% in 1985, thanks primarily to General Motors, which recently announced plans to build a $500 million light-duty truck assembly plant immediately southwest of the city. However, the likely continuance of perverse federal economic policies, whose negative effects fall primarily on the relatively large manufacturing and agricultural segments of the area economy, puts the 1985 forecast at substantial risk.

It appears that the 1984 forecast, which, coincidently, was the same as the 1985 forecast, will be slightly low, although the final results are, of course, not yet in. Seasonally adjusted nonagricultural payroll employment increased 3.2%, from 157,900 to 163,000, between the third quarter of 1983 and the third quarter of 1984. The increase was split 3 to 2 between manufacturing and nonmanufacturing. Through the third quarter of 1984, the area economy had recouped essentially one-fourth of the 29,000 jobs lost between 1979 and 1982.

Local Factors

The announcement by GM last August 31 of plans to build a 2.1 million-square-foot facility, which will employ about 3,000 people on two shifts, demonstrates the difficulties of forecasting small metropolitan area economies. Suddenly, one company will almost dictate the employment trend throughout 1985. GM has announced that as many as 4,000 to 5,000 could be employed during construction at the 937-acre site. Although no timetable for these employment increases has been released, it seems logical to assume that the major impact will be in 1985 since production is scheduled to begin in the fall of 1986. Additionally, given the transient nature of the numerous contractors involved, one has to wonder how much of the construction employment will be reflected in area employment data.

Another significant source of basic employment and revenue scheduled to come on-stream at the start of 1985 is the Grand Wayne convention center, opening in downtown Fort Wayne. This employment supported by "outside" revenues will be a nontraditional but welcome addition to basic employment.

National Factors

If the exchange rate of the dollar does not decline in 1985, area manufacturing and agricultural activity will continue to be

*The Fort Wayne area includes Adams, Allen, Dekalb, and Wells counties. Effective June 30, 1983, the Fort Wayne Metropolitan area (MSA) was redefined to include Whitley county and exclude Adams and Wells counties. However, employment data has yet to be switched to the new definition; accordingly, the forecast relates to the old definition.

affected negatively. Imports will further erode the market for domestically manufactured goods, and the export market for agricultural products will remain uncompetitive. In fact, the probability of experiencing our first import-sector-induced recession grows daily in the face of the continuing strong dollar.

As noted in the national economic outlook, beginning on page 2, domestic automobile sales are forecast to be relatively flat in 1985; thus, area auto-related manufacturing should also be flat. This forecast derives not so much from a lack of demand but from already active domestic production capacity constraints. Additionally, if import restrictions were lifted this spring, significant substitution of imports for domestically produced autos could cause domestic auto production to decline.

The only aspect of current national economic policy specifically favorable to some Fort Wayne area manufacturing is the continued emphasis upon an increasing defense sector budget.

Summary

The 1985 forecast is for the Fort Wayne area economy to extend its cyclical recovery to a third year, based more on the strength of special local factors than on the forecasted improvement in the national economy. In fact, the rapidly eroding markets for domestically produced goods, caused by imports, put the area, and the national, economic forecasts at substantial risk in 1985. ☐

Evansville

Maurice Tsai

Professor of Economics, University of Evansville

What happens to the Evansville regional economy depends largely on what happens to the national economy. In 1984, the economic well-being of both rose in the first quarter, declined slightly in the second and third quarters, and probably will have risen again in the fourth quarter. Likewise, in 1985 the regional economy will mirror the nation's. The nation's real GNP is predicted to grow at a 4% rate, and the inflation rate will be about 5%. Interest rates will decline moderately, on the order of 1 percentage point. National unemployment will drop to 6 to 7% by year end.

Based on these assumptions, the Evansville economy, as indicated by the Evansville Area Business Index, should show a moderate growth of about 2% in 1985, building on the approximately 2.5% increase achieved in 1984. With an increase in labor productivity, the increase in real regional output should be about 5 to 6%. No major economic disruptions, such as labor disputes, oil price hikes, or severe damage to agricultural crops, are expected.

Under such conditions, industrial production is expected to continue its growth in the area, although at a slightly slower rate than in 1984. A continuous rise in personal income, in monetary as well as in real terms, and improved housing construction due to lower interest rates may stimulate and sustain consumer spending on durable goods, which are major products of the regional economy.

The savings rate, which hit its lowest level, 4%, in 1983, rose to about 6% in 1984, and it should remain at that level or even rise to 7% in 1985. Such an increase in the savings rate nationally should not reduce consumer spending by a like amount because personal income has been growing at about 5% in real terms. With lowered interest rates, and with inflation

Evansville Area Business Index

(1977 = 100)

Period	*Industrial Production*	*Trade and Services*	*Construction*	*Transportation*	*Finance*	*Employment*	*Composite Index*
1984							
January	115.73	108.94	100.47	96.67	106.98	103.78	109.05
February	119.33	105.35	103.19	93.81	102.47	103.09	108.83
March	124.93	103.85	110.07	95.05	105.64	102.82	111.01
April	118.17	103.82	108.74	93.92	106.97	102.06	108.48
May	112.39	105.57	108.10	93.73	105.29	102.48	107.02
June	113.00	104.72	107.44	94.05	106.93	101.66	106.86
July	112.25	104.43	109.26	93.43	104.95	102.88	106.70
August	111.21	106.57	98.02	96.87	107.67	103.97	106.53
September	110.05	107.36	99.57	94.23	106.87	104.50	106.42
Annual Index							
1981	108.83	102.28	107.63	98.94	97.95	105.57	105.01
1982	104.52	102.36	103.62	93.23	102.40	102.85	102.64
1983	108.14	104.10	116.09	91.36	104.60	100.71	105.41
1984 (estimated)	112.50	106.20	106.00	94.50	106.00	103.50	108.00
1985 (projected)	116.00	108.00	110.00	96.00	107.00	105.00	110.00

apparently under control, consumer confidence will not deteriorate substantially. Thus, it is reasonable to expect a solid increase in retail and also in wholesale business. Automobile sales may remain strong in the coming year, but will probably not be as active as in 1984. The services industry in general should continue its growing trend, with the exception of medical services. Locally, the demand for medical care has shown some decline in 1984, and this trend may continue into 1985, although at a slower rate. The overcapacity of medical facilities needs to be corrected, and some reduction in medical personnel has been undertaken.

Construction activities have been sluggish in 1984, especially in the second half, mostly due to high interest rates. In spite of this, the construction activities in 1985 will be sustained by public construction and business construction projects. The Division Street Expressway project, the Highway 57 project, the expansion of the Evansville museum, and several other commercial projects are underway. Housing construction may rebound as weather conditions improve.

Transportation activities will keep pace with industrial growth as they have in the past. Deregulation of trucking and airline services has reduced local activities in the last two years, but adjustments to the new situation have been going well. Services recently added to local air transportation should result in more activity.

The financial sector grew slightly in 1984; more branch offices were built in the area. Lower interest rates and steady growth should stimulate more lending activities.

Area employment improved in 1984 over the trough of 1983 and will continue to improve and return to the higher 1981 level. From December 1983 to September 1984, local employment increased by 4,800 while unemployment decreased by 3,100. The unemployment rate in January 1984 was 10.2% and dropped by 7.8%, slightly above the national and Indiana rates. In 1985, this rate is expected to drop to 7% or less. Improvement in employment has been lagging behind overall economic improvement.

The improvement in the economy from 1983 to 1984, as indicated by the increase in the composite index from 105.41 to an estimated 108.00, is expected to continue into 1985. The rate of growth will be less than it was in 1984, but will still be cause for favorable comparisons with the trough we have just endured. □

Jeffersonville-New Albany (Louisville Area)

Fay Ross Greckel

Professor of Economics, Indiana University Southeast

The Louisville metropolitan area economy moved upward at a moderately strong pace during 1984, and moderate growth is likely to continue in the months ahead. The recovery, which began in some sectors during 1983, was evident throughout the economy this year, although growth is still somewhat uneven and most areas have yet to match their pre-recession performance.

Employment in the five-county metropolitan area (Clark and Floyd Counties in Indiana and Jefferson, Oldham, and Bullitt Counties in Kentucky) climbed to over 375,000 jobs, on a seasonally adjusted basis, in the third quarter of 1984. This total was nearly 11,000 jobs higher than in the weakest quarter of 1983, but still some 28,000 jobs below the 1979 peak employment level. As Table 1 indicates, nonmanufacturing job losses were not too serious, and by October employment in this sector had risen to within 4,000 jobs of the 1979 level. Nonmanufacturing gains in 1984 were fairly widespread, with the exception of the service and government sectors.

Obviously, far greater job attrition occurred in manufacturing during the recent recession. Through most of 1984, manufacturing employment was about 4,500 jobs above the early 1983 trough, with gains especially noticeable in metals and machinery. Compared with 1979, however, there remains a shortfall of about 24,000 manufacturing jobs, many of which have been permanently lost through plant closures and changes in production technology.

Employment recovery thus far has been somewhat stronger within the two Indiana counties, which regained the equivalent of 35% of the 3,800 jobs lost during the last recession. However, most of the job growth occurred in 1983. Net gains in 1984 were barely 500 jobs. The most encouraging development in Clark and Floyd counties has been the rapid recovery of their manufacturing sector which, by October, nearly equaled the pre-recession 1981 peak job level. Offsetting that positive development, 1984 nonmanufacturing employment was lower than in previous years, particularly in retail trade.

Local employment gains, although not spectacular, contributed to real improvements in incomes and consumer confidence. Consumer borrowing has risen, delinquencies on bank loans have fallen to inconsequential levels, and metropolitan area new car sales have jumped 4,000 ahead of their 1983 volume—a 17% gain. The equivalent statistic for Clark and Floyd counties alone was an impressive 46% gain. (Although 1984 sales were very good, local car dealers sold 10,000 more new cars during 1978.)

An improving economy and lower interest rates led to substantial residential construction in Jefferson County and a fairly strong level of home building in Clark and Floyd counties. As can be seen in Table 2, the number of building permits authorized in Jefferson County in 1983 nearly equaled the number of dwelling units authorized in 1979. The slightly lower 1984 permit level included many fewer single family dwellings and many more apartment or condominium units than in 1979. During the first nine months of 1984, Clark and Floyd Counties authorized few, if any, apartments or condo-

Table 1

Louisville Area Employment and Unemployment, 1979-1984[1]

	Total Nonfarm Employment	Manufacturing Employment	Non-Manufacturing Employment	Unemployment Rate
Louisville Metropolitan Area[2]				
Annual Averages				
1979	402,700	109,400	292,300	5.2
1980	391,700	100,300	291,400	7.9
1981	383,400	96,500	286,900	9.0
1982	367,800	86,700	282,200	11.7
1983	365,200	82,500	282,700	10.5
Quarterly Averages				
1984:1	372,600	86,500	286,100	9.0
:2	372,900	85,100	287,800	9.5
:3	375,300	86,700	288,700	8.3
:October	375,000	85,700	289,300	9.2
Clark and Floyd Counties				
Annual Averages				
1979	46,800	12,100	34,700	6.3
1980	47,100	11,800	35,300	8.3
1981	48,200	12,300	35,900	10.6
1982	44,500	10,400	34,100	13.1
1983	45,100	10,700	34,400	10.5
Quarterly Averages				
1984:1	45,400	11,700	33,700	13.0[3]
:2	45,400	11,900	33,500	10.3[3]
:3	45,700	11,900	33,800	7.4[3]
:October	45,800	12,200	33,600	8.0[3]

1. The employment data refer to establishments located within the area cited; the unemployment data refer to residents of the area. Monthly and quarterly data are seasonally adjusted.
2. Includes Floyd and Clark Counties in Indiana and Jefferson, Oldham, and Bullitt Counties in Kentucky.
3. Due to statistical inconsistencies, this rate cannot be directly compared with the 1983 Clark/Floyd unemployment rates.

Sources: Indiana Employment Security Division; Kentucky Department for Human Resources.

Table 2

Residential Building Permits Issued, 1979-1984*

Period Covered	Jefferson County Kentucky	Clark County Indiana	Floyd County Indiana
1979: Q1-Q3	1860	463	316
1982: Q1-Q3	670	111	200
1983: Q1-Q3	1766	185	259
1984: Q1-Q3	1649	193	166

*Number of residential units for which building permits were issued, including single-family dwellings, apartment units, and condominium units.

Source: Kentuckiana Regional Planning and Development Agency.

minium units, unlike 1979; the number of single-family building permits issued amounted to about two-thirds of the 1979 levels.

Real estate sales had also rebounded very strongly in 1983. Sales for the first nine months of 1984 appear to be running slightly behind 1983 in Jefferson County and a little ahead of 1983 in southern Indiana.

This has been a year of significant economic improvement for large segments of the Louisville area. Employment is rising, unemployment is declining, and the majority of residents have higher real incomes. Nevertheless, as noted in past articles, many residents have yet to participate in the economic upturn. The usual cyclical problems represented by families facing extended (but still temporary) layoffs are compounded locally by the longer-term structural phenomenon of large numbers of labor force members whose well-paid industrial jobs have permanently disappeared, plus the continuing increase in female-headed families with limited earnings potential. As one indication of the dimensions and persistence of this problem, Dare To Care food centers filled emergency food requests for 58,000 families between January and September of 1984. This was an increase of 4,000 over the same period in 1983. Requests were actually rising toward the end of the period, as hard-pressed families used up available cash to pay accumulated utility bills rather than risk disconnections as cold weather set in.

The structural problems will continue to keep the Louisville area economy from rebounding at a very rapid pace. Many families receiving emergency food aid, for example, had in better times frequented area fast food restaurants, as well as other service and retail establishments. Many of the better-paid manufacturing jobs in firms that have closed or moved away will be difficult to replace in the foreseeable future.

Nevertheless, 1985 should be a year of continued moderate growth for the local economy, providing that national policy developments do not bring about a general recession. If, as seems probable, the national economy continues to grow—though more slowly—in 1985, then the Louisville area should see employment growing about as fast as in 1984 and unemployment continuing to decline. The 1979 employment levels will not be attained by the end of 1985, however.

Interest rates seem likely to be somewhat lower in the months ahead, and that should result in 1985 being a better year than 1984 for construction, real estate, and many of the local durable goods industries. Despite lingering problems, the local economy will also be strengthened by the favorable national attention focused on Louisville as a result of the presidential debate and the new medical technology—and by the increased optimism and energy manifested throughout the region in recent months. □

Muncie-Anderson

Robert R. Jost

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Six months ago, this analyst offered six reasons for the long-run decline of the Muncie-Anderson SMSAs. Given the vigorous recovery, particularly in the Anderson SMSA, one has to ask whether that relatively pessimistic analysis was influenced unduly by the severity of the 1981-82 recession. Quite possibly it was. Certainly this forecaster failed to perceive that the nation's 3.7% real growth in GNP for 1983 would escalate to nearly 6.8% in 1984. It is atypical for the second year of a recovery from a deep recession to substantially exceed that of the first year, and it was hardly to be expected, given the high real rates of interest that prevailed throughout the recovery. This analyst finds some solace in not being left nakedly alone, for the entire forecasting fraternity failed to predict the exuberant real growth of the nation's economy in 1984.

This rapid cyclical rebound does not, however, vitiate the long-run analysis presented in the May-June issue, in spite of the good news from 1984. When the U.S. economy troughed in November 1982, the Anderson and Muncie SMSAs had nonfarm employment totals of 45,100 and 47,800, respectively, and unemployment rates of 19.5 and 18.6%. The latest current data available for September 1984 shows employment totals of 53,600 and 50,600 for Anderson and Muncie and unemployment rates of 8.3 and 7.1%. This is a somewhat modest employment increase of 6% for Muncie, but a whopping 19% for Anderson—the latter riding the crest of a boom in auto sales. How then can one justify labeling the auto industry as "sick" in the May-June *IBR*? Between 1977 and 1982, employment in the American auto industry declined 22% and domestic auto output 30%. Despite the rapid recovery, auto industry employment and output remain substantially short of earlier highs. Indeed, Anderson's robust recovery loses some of its luster when one reckons that non-agriculture employment as of September 1984 was 9% *below* that of November 1978. The Muncie SMSA was down 7% during the same period. Nevertheless, Indiana's recovery in 1983-84 exceeded the expectations of this author as well as most other forecasters; intense foreign auto competition, combined with high real interest rates, was expected to produce a more subdued rebound.

In retrospect, it is clear that the second oil shock of 1978-79 resulted in Americans switching to fuel-efficient foreign cars. New domestic car registrations peaked at 9 million in 1978 and commenced a prolonged decline, bottoming out at 5.5 million in 1982. This was followed by a modest upturn to 6.5 million in 1983 and a sharp increase to 8 million in 1984. During the precipitous decline, the import share of new car registrations escalated from 18% in 1978 to almost 30% in 1982, but declined to approximately 25% in 1984 as gasoline prices went down. Domestic auto production has obviously been the beneficiary of the strong cyclical upturn following the prolonged recession as well as the switch back to relatively less fuel-efficient, large American cars as a consequence of significantly reduced gasoline prices. Nevertheless, one must weigh heavily the "voluntary export restraints" (VERs) placed on Japan in April of 1981 to account for the recent decline in the import share. A 1983 Wharton econometric study estimates that as a consequence of these quotas, the price of these superior Japanese vehicles jumped $920-$960 per car in 1981-82. Currently some Japanese cars are selling for more than $3,000 over their sticker prices as a consequence of this artificially created scarcity. R. W. Crandall of the Brookings Institute estimates these VER protectionist policies are not only a significant factor in the current profitability of the American auto industry, but that they cost the American consumers some $4.3 billion in higher auto prices in 1983 alone. Such protectionist policies represent a gross misallocation of resources and tend to deprive a "sick industry" of the incentive to become healthy. In the long run, the viability of the American auto industry will depend upon its ability to compete in price and quality in the world markets.

There is a danger that the vigorous cyclical recovery will again stimulate complacency in the motor vehicle industry--the large bonuses given to auto executives and the subsequent contract settlement with the UAW did nothing to close the differential between American and Japanese labor costs. Were the "voluntary" export restraints to be lifted tomorrow, both confidence and domestic auto production would likely suffer a traumatic decline.

Nonetheless, the exuberant recovery has attenuated some of the long-run problems confronting the Muncie-Anderson SMSAs. Recently released data from the Census Bureau indicate that between 1980 and 1982, the population of Anderson and Muncie SMSAs declined by 2.9 and 2.2%, respectively. While comparable census data for 1983-84 is not available, one would be tempted to conjecture that the Anderson SMSA probably recouped some of its losses in that period. Data obtained from monitoring enrollment in Delaware County schools suggest the outmigration from the Muncie SMSA may have subsided during the past two years. Nevertheless, the long-run forces that help to account for the previous outmigration continue. Anderson's continued reliance on durable goods manufacturing not only subjects its economy to the vicissitudes of the business cycle, but being dominated by one industry—nay, by one firm—also leaves Anderson in the unenviable position of being a high-wage GM company town. Examples of the vulnerability of one-industry towns to economic changes are legion. As the auto industry has matured and shifted to more standardized production processes and greater reliance on less skilled labor, it becomes worthwhile to relocate production facilities to lower-cost areas or countries. GM has been exporting jobs from Anderson to the South and, to a lesser extent, to other countries for more than a decade. If GM were to ascertain that the alternators currently produced at one of Anderson's Delco plants would be produced for, say, two-fifths of the cost in South Korea (a major auto parts producer with the capacity to do the job), the contract might well go to the Koreans. If GM did not indulge in such cost calculus, it would be remiss in its duty to its stockholders and further weaken its competitive edge. One can readily argue that the past dominance of the auto industry in Anderson has kept other firms from coming to such a high wage area and has actually accelerated the departure of other traditional manufacturing firms from the SMSA. To a much lesser degree, Muncie-Chevrolet, Delco Battery, and Warner Gear have an analogous impact on Muncie.

Much has been said about high-tech industries being brought into Indiana in recent years. Both high-tech commissions and state planning agencies have sung the praises of New England's successful transition to high-tech industries after languishing in the wake of the departure of shoe and textile industries to other areas. What little we know about the way these high-tech industries choose their sites does not bode particularly well for Indiana. First, they tend to locate in areas offering academic expertise in science and technology, since the demand for professional engineers and technicians is proportionally far greater than in traditional industries. However, Indiana ranks forty-seventh among the states in the percentage of its high school students going on to college, and state per capita investment in education is not far from the bottom of the totem pole. In short, Indiana is not overly committed to investing in human capital and remains light years away from matching the educational and technological superiority of New England. Second, much of the venture capital sought by high-tech firms comes from individual entrepreneurs previously successful in high-tech who choose to channel their resources into new technological ventures. In Indiana, there is little in the way of a high-tech base from which to derive high-risk capital. Bankers in this area lack the expertise to appraise high-risk technical ventures, and when they do commit funds to such enterprises, they tend to earmark them for plant and equipment rather than needed working capital. Third, high-tech firms tend to move to low-wage areas. Wages in the Great Lakes Region average 14% more than those in New England, and auto industry wage rates are much higher than those of manufacturing as a whole. Thus, the unionized high-wage workers of Anderson and Muncie are not attractive to high-tech industries.

Unless the major auto firms in the Anderson-Muncie SMSA can compete more effectively, employment in these firms will continue to decline in the long run, with each successive recession resulting in plant closings or employment cutbacks and more outmigration. The most probable influx of high-tech into this area is within the auto industry itself, both in its products and its production processes. The auto industry is already attempting to get into the business of making robots and computer chips. Additionally, one might surmise that the American competitive position would improve were domestic auto firms able to serve up a major technological breakthrough. According to one industry source, GM is in the throes of applying a technological concept developed by Chance-Vought in World War II for aircraft engines. Ostensibly, this technology involves self-firing engines utilizing electronic sensors that eliminate the need for a starter, substantially reducing the size of the battery and alternator as well as the ring-gear and bell housing of the transmission. These changes would reduce the weight of a medium-sized automobile by perhaps 300 pounds. Considering that starters, alternators, and car batteries are made in the Muncie-Anderson SMSAs, one could at most speculate on what the short-run effect on local employment would be. However, for the domestic auto industry overall, it might provide a much-needed forward thrust which would better enable domestic producers to meet global competition.

If the nation's economy achieves 4% real growth and *if* total auto sales reach the 10.5 million mark predicted in I.U.'s optimistic forecast, then the Muncie-Anderson economies should weather 1985 in good shape. Additional employment gains may be achieved but they will come at a more subdued pace and will be oriented toward services and other sectors rather than durable goods production. Although the Anderson economy outperformed the Muncie economy in terms of employment gains in 1983-84, Muncie may close the gap in 1985. On the credit side of the ledger, the Muncie Chevrolet plant has been divested from the GM Chevrolet division and now operates as part of the Detroit Diesel Allison division. Company spokesmen opine that during the next three or four years 1,000 employees will be added to the plant's workforce. Currently, plant employment is down to 1,400 employees; future gains will reflect the startup of three new transmission models in 1986-87. The plant may also become a gear supplier to the Indianapolis Allison plant which produces truck and bus transmissions. A few new, small firms have located in Muncie, and a medium-sized firm that had previously shut down has again commenced operations. On the debit side, additional layoffs have been made at the Westinghouse transformer plant, which now employs only 480—a far cry from the 1,600 who worked there twenty years ago.

Muncie and Anderson should benefit from the continuing improvement in the economy in 1985. If the auto industry is farsighted and persistent in trying to regain its health, that too will make the outlook for the Muncie-Anderson SMSAs brighter. □

Indiana Industrial Electricity Sales (in Millions of Kilowatt Hours)

City	*September 1984*	*August 1984*	*September 1983*	*Percent Change From:*	
				Last Month	*One Year Ago*
Anderson	19.4	21.1	21.1	−8.05	−8.05
Bedford	14.1	15.6	14.7	−9.61	−4.07
Bloomington	4.3	4.2	5.0	2.38	−13.99
Columbus	19.1	22.3	17.9	−14.34	6.70
Connersville	9.6	10.3	10.3	−6.79	−6.79
Crawfordsville	14.0	13.6	12.8	2.94	9.38
East Chicago	22.8	22.2	20.7	2.70	10.14
Elkhart	24.7	25.1	24.2	−1.58	2.07
Evansville	45.2	55.2	50.1	−18.11	−9.77
Fort Wayne	50.3	52.2	47.4	−3.63	6.12
Frankfort	9.1	9.4	8.8	−3.18	3.41
Gary	156.9	175.8	189.5	−10.74	−17.19
Goshen	10.4	10.7	10.6	−2.79	−1.88
Hammond	60.8	62.9	60.8	−3.33	.00
Huntington	5.9	5.2	5.8	13.46	1.72
Indianapolis	360.4	371.3	365.1	−2.93	−1.28
Jeffersonville	5.3	5.4	6.0	−1.84	−11.66
Kokomo	81.0	89.9	78.3	−9.89	3.45
Lafayette	45.1	44.7	47.5	.89	−5.04
LaPorte	12.3	12.8	12.9	−3.90	−4.64
Logansport	9.1	10.3	9.6	−11.64	−5.20
Madison	3.3	3.3	3.5	.00	−5.70
Marion	31.1	34.8	32.2	−10.62	−3.41
Michigan City	52.4	51.0	21.8	2.75	140.37
Muncie	22.3	21.5	22.1	3.72	.90
New Albany	5.4	5.3	5.3	1.89	1.89
New Castle	10.3	11.2	9.6	−8.03	7.29
Peru	5.9	5.8	5.6	1.72	5.36
Richmond	24.4	29.2	26.1	−16.43	−6.50
Seymour	2.5	2.7	2.8	−7.40	−10.70
South Bend	28.3	28.1	29.0	.71	−2.40
Terre Haute	25.1	26.4	28.4	−4.91	−11.61
Valparaiso	9.1	9.4	9.5	−3.18	−4.20
Vincennes	3.3	3.4	4.1	−2.93	−19.50
Wabash	8.7	8.4	5.0	3.57	74.00
Indiana	**1850.1**	**1973.3**	**1976.2**	**−6.23**	**−6.37**

United States Business Indicators[1]
(Seasonally Adjusted Indexes Unless Otherwise Noted, Base Period: 1967 = 100)

Employment	*Latest Month*		*Previous Month*	*One Year Ago*
Nonagricultural Employment	September	143.9	143.7	138.3
Manufacturing Employment	September	100.8	101.4	96.1
Average Weekly Hours (No.)[2]	September	40.7	40.4	40.8
Average Weekly Earnings ($)[2]	September	375.25	369.26	362.71
Nonmanufacturing Employment	September	162.1	161.6	156.2
Unemployment Rate (%)	September	7.3	7.4	9.1
Unemployment–Married Males (%)	September	4.6	4.4	6.1
Production				
Bituminous Coal Production	August	188.3	186.2	153.1
Industrial Electricity Production	June	158.6	158.6	141.8
Manufacturing Production	September	166.7	167.8	155.1
Construction				
Construction Activity–Total	August	397.6	396.9	354.6
Residential Housing Starts	September	130.4	119.8	130.7
Residential Expenditures	August	533.4	533.0	499.7
Nonresidential Expenditures	August	338.5	337.8	290.2
Public Expenditures	August	219.1	219.1	207.7
Other Indicators				
Passenger Car Sales (Thousands)[2]	September	745.0	814.0	705.0
Year to Date (Thousands)	September	7933.0	7188.0	6786.0

1. Current indicators are preliminary and subject to revision.

2. Not seasonally adjusted

U.S. Man-Hours in Industrial Production (Millions)
(Seasonally Adjusted Data)

	Latest Month		Percent Change From:		Percentage Change at Annual Rates		
			One Month Ago	*One Year Ago*	*Latest Month*	*Previous Month*	*One Year Ago*
Manufacturing	September	808.8	0.5	6.1	5.7	19.5	21.9
Food	September	68.4	−1.0	−0.3	−11.7	34.5	7.0
Apparel and Textiles	September	67.6	−2.3	−3.5	−24.3	−8.0	9.8
Lumber and Wood	September	27.2	−1.5	−3.8	−16.7	−24.5	2.0
Furniture	September	19.3	2.3	6.0	31.6	−14.3	28.3
Paper	September	28.4	0.8	1.5	10.5	−26.9	44.5
Printing	September	50.2	1.7	2.7	22.1	−8.6	2.1
Chemicals	September	43.9	−1.3	1.2	−14.2	−41.8	4.6
Petroleum and Products	September	8.0	−3.3	−6.3	−32.8	−4.5	2.0
Rubber and Plastics	September	33.1	0.2	6.6	2.7	8.1	41.5
Stone, Clay and Glass	September	26.1	0.0	3.4	0.2	−6.6	15.5
Primary Metals	September	36.3	0.9	3.4	11.3	−6.6	38.8
Fabricated Metals	September	61.8	0.7	11.9	8.4	27.0	10.0
Nonelectrical Machinery	September	89.0	−0.9	10.4	−10.5	22.0	15.3
Electrical Machinery	September	92.9	0.8	10.1	9.6	−3.0	47.8
Transport Equipment	September	81.2	2.1	9.3	28.9	−30.5	131.4

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Daniel F. Evans **The Governor's Committee on Indiana's Utility Future: Background and Introduction**

The Governor's Committee on Indiana's Utility Future: Summary and Overview

Two Commentaries

Lisa Kobe The Indiana Chamber of Commerce's Position on Economic Dispatch

David Culp A Consumer View from the Citizens Action Coalition

John Spellman **Home Heating Fuels in Indiana**

In this issue . . .

Many topics occupy the public's attention in Indiana. Few are more important to our long-term well-being than the performance of our public utilities. The recent report by the Governor's Committee on Indiana's Utility Future has not received the attention it deserves. To rectify that oversight, we take pleasure in publishing the summary and overview to that report. Marcia J. Oddi, executive director of the Governor's Committee, helped us develop this issue; we are grateful for her assistance.

As a preface, Daniel Evans, who chaired the committee, provides us with important background information.

Now the many interested parties need to study the report and understand its recommendations. Two such views are offered here. David Culp of the Citizens Action Coalition and Lisa Kobe of the Indiana Chamber of Commerce present comments on selected topics in the report.

Finally, John Spellman places the issue of regulated energy rates in perspective by showing, county by county, how Hoosier households are heated.

We believe that our attentive readers will form their own views and make them known to the Indiana General Assembly.

MJM

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The Governor's Committee on Indiana's Utility Future: Background and Introduction

Daniel F. Evans

Chairman, Governor's Committee on Indiana's Utility Future; Treasurer, Wabash College

In February of last year, nine individuals with diverse backgrounds met to address the perceived problem that State law and practice relating to the regulation of utilities should be improved. These individuals did not know one another well, and none considered himself an "expert" or well informed concerning general utility law and regulation. Two of the nine had served on the Marble Hill Task Force, and this experience made them somewhat better prepared and more helpful than others of us. Yet, it is fair to record that each committee member approached the assignment with less than complete confidence. The general climate within the State at the time was broad dissatisfaction by ratepayers, investors, and utility employees. Key legislators were calling for change. At the time he released the Marble Hill report, the Governor had committed himself to a broad look at the problem.

Eleven months and 14 meetings after its appointment, the committee made 19 recommendations, 16 of which call for change either in statute or regulatory practice. Each meeting ranged from a half to a full day and was preceded by written staff reports. A technical panel of academic professionals was selected, and its presentations to the committee as organized by a coordinator were essential to the committee's education. Also, a specialist panel was selected, consisting of representatives for interest groups from which it was important that the committee receive either information or points of view. Those groups included industry associations, consumer groups, and official representatives of utility service providers. Major presentations to the committee were made by the Advisory Council to the Utility Consumer Counselor, which conducted statewide hearings. Members of the Public Service Commission were at most of the committee's meetings, where they were available for questions, and the Commission's chairman made a comprehensive presentation.

Throughout the 11-month process, the Governor's executive assistant met with the committee. However, it may be important to know that, if the Governor had his own program for utility reform, it was neither pushed onto the committee nor was it made known. The Governor's posture was limited to providing resources, either staff or funds, so that the committee could work its way and find its will within the time allotted to it. The committee had a small staff, two full-time and two part-time, plus outside paid consultants, with the executive director and the coordinator of the technical panel named by the Governor.

The committee's report is organized by industry: electric, natural gas, telecommunications, and other (small utilities, municipal utilities, and transportation); yet, its analysis came increasingly to center on three tests—

1. Are incentives provided for efficient operation?
2. Will the prospects for industrial growth be improved?
3. Are ratepayers assured reasonable protection?

The committee believes that its recommendations provide affirmative answers to each of these questions. Readers will find that the recommendations do not offer easy, quick solutions. The committee believes, however, that over time its recommendations will provide an improved utility environment.

Readers interested in the full report will find that each industry is first described by an Introduction. Issues and recommendations are then addressed by sections on Background, Options, and Recommendations. There are 171 pages in the report, and it may be obtained from the committee's office at L-120 Harrison Building, 143 West Market Street, Indianapolis 46204.

The Governor's Committee on Indiana's Utility Future: Summary and Overview

The Governor's Committee on Indiana's Utility Future has examined issues and made recommendations in the areas of electric power, natural gas, telecommunications, water and sewer, and transportation. The committee has looked at problems relating to the regulation of investor-owned, not-for-profit, cooperatively-owned, and municipally-owned utilities. It has dealt with issues involving utilities serving only a few dozen customers, as well as those serving over half a million people.

Electricity

The area to which the committee has devoted the most time, and the area of the most public concern, is that of electric utilities. Generally, the largest utility bill a customer pays is his electric bill. The residential customer is affected directly by the size of that bill. He also is affected indirectly, because industry must also pay those costs. The cost to industry of Indiana electric power, as compared to other states, will have a direct relationship to the retention of jobs in Indiana and to the future economic development of the State. The broad objective of the committee in examining the electric area has been to find ways to assure an adequate future supply of electricity in Indiana at an acceptable price.

Forecasting. The present law requires that the Public Service Commission "develop, publicize, and keep current an analysis of the long-range needs for the expansion of facilities for the generation of electricity." Presently, the Commission depends on staff-obtained or staff-prepared forecasts to fulfill these requirements. The committee recommends that the Commission solicit proposals from, and enter into an agreement with, one or a consortium of institutions for higher education located within the State. The entity ultimately awarded the contract would be required to establish the methodology for and construct, implement, and maintain models to develop and keep current an independent statewide forecast of electricity need for the State. Input from the utilities and other interests would be solicited both in development of the models and in the provision of data to run the models. The changes in forecasting responsibility recommended by the committee would not eliminate the need within the Commission itself for staff with sufficient expertise to assist in the evaluation of the forecasts prepared by the university group; ultimately it is the five-member Commission itself which must evaluate and adopt "an estimate of the probable future growth of the use of electricity."

> *The cost to industry of Indiana electric power, as compared to other states, will have a direct relationship to the retention of jobs in Indiana and to the future economic development of the State.*

Review of Need. An accurate statewide forecast, annually updated, is the key to insuring that Indiana keep abreast of future demand for electricity—that the citizens of the State are faced with neither a glut of unneeded generating capacity nor a shortage of capacity which cripples the economic development of the State. The present law insures that no construction of generating capacity can occur in the future without approval from the Commission, based on its projections of the need for the new plant. However, the present law contains no requirement that the Commission periodically review the continuing need for the construction project by measuring the capacity it will produce against any changes in the updated statewide forecast. The committee recommends that the law be amended to insure such periodic review. With this change, if a review were to indicate that the forecasted demand had turned down sufficiently to so warrant, the Commission would alter or revoke the certificate. In the event of cancellation of a project on this basis, the utility would be entitled to recover its investment to date, plus a return on that investment. Challenges to the utility's recovery on the basis of imprudent assumptions regarding future demands would be foreclosed—the responsibility for projecting future demand would ultimately fall upon the State. Questions of prudency in other areas, however, would not be forestalled by the revocation of the certificate on the basis of reversals in demand.

Construction Reviews. The present law contains a requirement that the Commission review proposed construction costs, along with need, before granting the construction certificate. The present law also implies some obligation on the Commission to "maintain an ongoing review of such construction as it proceeds" and states that the utility "shall submit each year during construction a progress report and any revisions in the cost estimates for the construction." Questions of whether this language implies a continuing prudency review of the project on the part of the Commission and the implications of the Commission's annual sign-off on the construction progress report and the revised cost estimates have led the committee to recommend changes in this part of the certificate of need law. Specifically, the committee recommends an amendment authorizing a utility which has obtained a construction certificate and has submitted its initial estimate of the projected cost of the project to choose one of two courses:

(1) To ask for a review by the Commission of its construction and costs at intervals such as 25% complete, 50% complete, and so forth.

(2) To wait for review until the plant is completed.

However, if the law in force at the time of the project permits recovery on the basis of construction work in progress and if the specific utility has chosen to utilize that approach, only the first course would be available to it.

In the event a utility chooses the percentage completed approach, an approval by the Commission on the work and costs of a specific proportion of a project would preclude later challenges to that portion. Disapproval would be on the basis that cost overruns of the plant (because of inflation or poor management) had made completion uneconomical, or on the basis of poor quality control, or for other reasons. Disapproval could result in a revocation of the certificate and cancellation of the project. Such cancellation would precipitate a hearing to determine how much of the cost of the project could be recovered from the ratepayer. It is the committee's recommendation that recovery of both the investment and a return thereon be permitted for all expenditures during the phase of the project under review which are not found to be imprudent, and that the investigation into past activities and expenditures already approved by the Commission in prior reviews be foreclosed, absent a showing of fraud.

In the event the utility chooses the second approach, that of waiting until the plant is completed for any review of construction and costs, questions of prudency would be limited to quality control issues, provided the utility has brought its plant into operation at, or below, its original projected costs. Cost overruns, on the other hand, would be susceptible to all the normal challenges.

Capacity. The committee recommends that the certificate of need law also be amended to permit a utility, at its own risk, to build capacity in excess of the limitations set by the Public Service Commission in granting it a certificate of need. However, it is essential that, in reviewing proposals for financing the total project, the Commission assure itself that the utility will not, in building this extra capacity, put itself in financial jeopardy to the extent that the ratepayer ultimately may suffer.

Refurbishing. The certificate of need law provides that, in acting upon an application for new construction, the Commission take into account "other methods for providing reliable, efficient, and economic electric service, including conservation, load management, and renewable energy sources." The committee recommends an amendment to provide that a utility applying for permission to construct a new generating facility be required to show to the Commission the advantages of such new construction over the refurbishing of some of the utility's existing generation.

The intent of the preceding amendments to the certificate of need law is to insure that new plants be built only when the Public Service Commission has assured itself that the demand for the electricity which will be produced by the plant will justify its construction, that the cost of the plant and the related price of the electricity generated by the plant are not excessive, and that the project itself represents the most reasonable method to meet future demand.

Conservation. The committee does not believe that additional statutory provisions are required to encourage utilities to make investments in, or expenditures for, conservation purposes. The committee does recommend that continuing efforts be made within the State to encourage the development of cogeneration and other alternatives to traditional generation facilities.

"Rate Shock." Several new generating plants are scheduled to be completed in Indiana within the next several years. With respect to these projects, the committee recommends that the Public Service Commission consider mitigating the impact of rate shock on the customers of the utilities building these projects by phasing in the rate increase occasioned by the completion of such construction through the application of either rate trending (a phasing in of the total amount of the increase over several years after the plant has gone on line) or economic depreciation.

At the present time, none of the Indiana investor-owned electric utilities have specific plans for the building of any new generating facilities once the projects in process are completed. Eventually some new plants will have to be built. The committee has looked at the question of how the costs of these new plants may be minimized, and how the impact of rate shock on the customers of the utilities building these future plants can be alleviated. With respect to these plants not yet begun, the committee recommends that future projects be financed on a pay-as-you-go basis, eliminating the tremendous accumulations of carrying charges seen in recent projects. This change would be accomplished by allowing the rates of such utilities to reflect the cost of construction as it proceeds (CWIP). This recommendation is conditioned upon implementation of the committee's recommendations regarding the continuing review of such projects.

The committee recommends that substantial efforts be made to encourage utilities undertaking the construction of generating facilities in the future to minimize the impact of such plants on their customers' bills by scaling down the size of such projects wherever consistent with economies of scale, and by sharing the ownership of such plants with other utilities so that each utility's customers bear only a proportionate share of the total cost of the project.

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Incentives. With respect to incentives to keep operating costs down, the committee recommends that the Public Service Commission implement the modified future test year concept, whereby the Commission would set rates based upon the operating cost goals it intends for the utility to attempt to meet. This approach should also incorporate the "band of return" concept, designed to encourage innovation and operating efficiency and to discourage frequent filings for general rate increases.

With respect to the ultimate incentive to keep costs down—competition—the committee recommends that the State begin to position itself so that the benefits of deregulation of generating facilities may begin to accrue to its citizens at the earliest possible opportunity. Although this goal may be far in the future, institution of the statewide power pool with central economic dispatch may be the first step in this direction.

Power Pool. The committee commissioned R.W. Beck and Associates, Consulting Engineers, to conduct an engineering study to determine what potential savings might result from the implementation of a power pool with centralized economic dispatch. The conclusions of the Beck study indicate a significant potential for savings. "Centralized economic dispatch of the generating resources of the utilities included in the study will provide substantial economic benefit in the State of Indiana." According to information supplied by the utilities, at least one utility has entered into several take-or-pay-type coal contracts which require it to purchase coal whether it is burned or not. If these coal contracts cannot be modified, the Beck study finds that the benefits from centralized economic dispatch will reduce the cost of power production in the State by approximately $500 million over the ten-year study period. In the absence of contractual constraints, the benefits from economic dispatch could approach $1.4 billion.

The Beck study also concluded that the benefits derived from centralized economic dispatch can be equitably shared by the individual utilities. Centralized economic dispatch can be accomplished in a manner consistent with accepted standards of reliability. The generating capacity required to maintain voltage control, to maintain spinning reserves, and to limit transmission system loading would be scheduled to run as required. Periodic and emergency maintenance of the generating units can be performed as required.

The committee recommends that the electric utility companies operating in the State of Indiana and the Public Service Commission cause a study to be undertaken with a view toward cooperative centralized economic dispatch. The Public Service Commission should require the results of that study to be submitted no later than September 1, 1985. The Public Service Commission will report to the Governor and the legislature by December 1, 1985, its recommendation regarding the implementation of centralized economic dispatch. The committee, in recommending this approach, intends to indicate its strong endorsement of the concept of centralized economic dispatch and its hope that the system, if feasible, might be implemented.

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Accomplishment of the approach the committee proposes in the electric area may require more than just the passage of legislation—it may require a change in the attitude of both the executives of the Indiana electric generating utilities and the members and staff of the Indiana Public Service Commission. It will require looking beyond the territorial boundaries of an electric utility when making decisions about how it will meet future demand. It will require modification of the idea that each utility must meet future increases in demand by building its own new power plants. It will further require that the Public Service Commission adopt a proactive regulatory style.

Natural Gas

Incentives. Although local gas distribution costs are regulated by the Public Service Commission, these costs represent less than 25% of the ultimate price of the gas to the customer. Another 25% goes to the interstate pipeline which transports the gas from the wellhead to the local distributor, and the remainder goes to the producer. This limited jurisdiction on the part of the State means that incentives designed to increase operating efficiency and thus lower prices can impact only a portion of the customers' total costs. Any decreases in costs of operation, however, will benefit the customer to some extent. Therefore, the committee recommends the same incentive approach to be taken in the natural gas area as it has recommended in the electric area—implementation of the modified future test year concept, in conjunction with the setting of a range or "band" of allowable return rather than one specific percentage figure. The intent of this incentive approach is to encourage innovation and operating efficiency, and to discourage frequent filing for general rate increases.

Intrastate Pipelines. Certain industrial concerns within the State have asserted that they can purchase natural gas themselves on the open market, from the interstate pipelines or directly from the wellhead, at a lower price than they can obtain it from the gas distribution companies which presently serve them. In some cases, transportation rates have been set by the local distribution utilities and approved by the Commission, allowing the local utility to charge a fee to pipe in this "outside" gas to the industrial purchaser—a fee sufficient to insulate the utility's other customers from the potential added burden of having one major customer drop out, yet still low enough that the industrial customer benefits from the transaction.

Where an agreement cannot be reached on such transportation fees, the industrial user may switch to another fuel. Or he may demand that local distribution utilities be mandated by the federal government to "carry" gas which a customer has purchased on his own. Or he may attempt to bypass the local distribution utility entirely by a direct connection to an interstate pipeline company. Any of these three approaches could work to the detriment of the remaining customers of the local distribution company because the sunk costs of the utility would have to be divided among a smaller number of users.

> *Accomplishment of the approach the committee proposes in the electric area may require more than just the passage of legislation--it may require a change in the attitude of both the executives of the Indiana electric generating utilities and the members and staff of the Indiana Public Service Commission.*

The State would have little control over an industrial user's switching from gas to oil. It would also have little to say about "mandatory carriage"; only the federal government has jurisdiction over interstate commerce. With respect to the third option—the building of an in-state connection to an interstate pipeline—the question of who has jurisdiction, the State or the federal government, has not yet been resolved. An Indiana case is now pending before the Federal Energy Regulatory Commission. In anticipation of the possibility that the question of state/federal jurisdiction over interstate pipelines directly serving retail customers within Indiana may be resolved in favor of the State, this committee recommends that legislation be adopted granting to the Public Service Commission jurisdiction to determine, on a case-by-case basis, whether the public interest would be best served by permitting an interstate pipeline to bypass the natural gas distribution utility mandated to serve the retail customers within a specific geographic area.

Telecommunications

The telecommunications environment is changing rapidly. Large portions of the industry are in the process of being deregulated. New technology is creating effective competition in some areas where competition previously could not flourish. Recognizing that we are in a transition period, the committee has tried to determine how the State, acting through its General Assembly and its Public Service Commission, can best position itself to traverse this period of change while assuring its citizens the continued availability of high quality telecommunications services at reasonable costs.

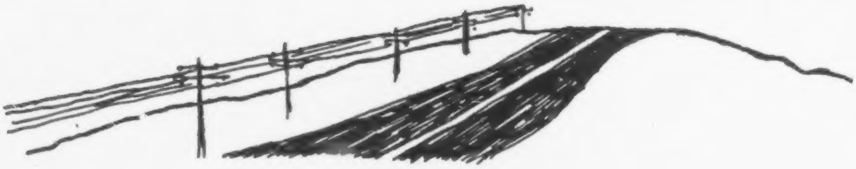
The committee recommends that legislation be enacted which sets out for the Public Service Commission the major goals and objectives the General Assembly intends for the Commission to meet, and the policy parameters the General Assembly intends for the Commission to stay within, when making decisions in the telecommunications area. Specifically, the committee recommends that the statute law be amended to include the following specific guidelines:

- Indiana's overall goal should be to foster an environment that will encourage the development and maintenance of a high-quality telecommunications system that will provide service at reasonable costs to as high a proportion of the population as possible.
- Insuring that Indiana be able to interconnect efficiently with interstate and international telecommunications systems should be a part of this goal.
- Fostering competition in the delivery of intrastate telecommunication services will further the attainment of this goal.
- The discontinuation of regulated rates should be rapidly pursued in those aspects of the industry where effective competition is determined to exist.
- In those instances where a regulated provider is facing effective competition, regulation of all providers should be eliminated in order to promote the public interest by fostering competition.
- State control of entry into the industry should be exercised only in those circumstances where it is clear that the public interest is served. Free entry should enhance competition, unless it is clear that service quality could be jeopardized or the company does not have the financial ability to maintain service.
- A presumption in favor of "cost of service" pricing should exist. This presumption should extend to both the overall costs of the system and to those costs that can be identified as usage sensitive. Measured service rates to cover usage sensitive costs are an appropriate means of achieving the "cost of service" objective, if the technology required for adequately measuring the service is available and does not itself appreciably increase the cost of service.
- Universal service should remain an overall goal. The rate structure should be designed to minimize the number of residents who, because of the cost, are unable to maintain access to telephone service. In the event that cost of service pricing results in local exchange rates that are so high as to preclude achieving the goal of universal service, some means of insuring that the goal of universal service is not significantly interrupted must be devised.
- In those areas of the telecommunication industry where effective competition does not exist, regulation should be continued to protect consumer interests and should be sufficiently flexible to encourage, on an equal basis, the introduction of technological improvements which promise to make currently noncompetitive areas open to effective competition.
- In those cases where regulated rates are required, it is in the public interest to allow depreciation that recognizes technological obsolescence.

Further, the committee believes that legislative oversight in the next several years over the Public Service Commission's implementation of the policy set out in the new statute is essential, both to "fine tune" the guidelines when necessary, and to take cognizance of major technological change that may require adjusting or modifying the statutory approach. The committee recommends that provision be made for such oversight.

Other Recommendations

Rate Base Valuation. The committee recommends that the law relating to the method of valuation of the rate base of a utility be amended to provide that original cost shall be the basis of valuation. This change will conform the language of the law to the current practice. It will bring Indiana in line with the majority of states.



It will eliminate the expense now involved in the presentation of expert testimony at a rate hearing relating to fair value; such testimony presently is utilized for no purpose other than to satisfy the procedural requirements of the statute. Valuing all rate bases at original cost gives some assurance of constancy to the Commission's work. It leaves only one variable in the equation used to compute allowed return (rate of return x rate base) rather than two, since original cost figures, in most cases, can be taken directly from the utilities' accounting records. Finally, it assures some basis for comparison of the returns of similarly situated utilities.

Small Utilities. The committee recommends the adoption of a comprehensive "small utilities" statute for the benefit of the customers of small, nonmunicipal water, gas, and electric utilities. The purpose of this new law would be to simplify the procedural requirements for small utility rate cases, as well as reporting and other requirements. Presently in many instances the same demands apply to utilities with several dozen customers and those with half a million customers. Rate case expenses which, when spread out over a large customer base, add only a few cents to each customer's bill can have a major impact when they must be absorbed by a customer base of only a few hundred people. It is essential, of course, that the new law include safeguards to protect the ratepayer from excessive or unwarranted increases. The committee believes, however, that it is possible to include necessary safeguards within a comprehensive set of simplified procedural requirements for small utilities.

Municipal Utilities. With respect to municipal utilities, the committee recommends: (a) the elimination of requirements that the Commission approve municipal utility rates and financings; (b) the adoption of rates by the municipal ratemaking body only after adequate notice to ratepayers and a public hearing; and (c) the provision of a limited appeal to the Commission from the decision of the municipal ratemaking body—on the basis that the decision is not based on substantial evidence, is arbitrary and capricious, or is contrary to law. This change would cut the number of state-regulated utilities in half, permitting the Commission to devote its resources to the utilities—both large and small—from whose actions the ratepayer has no other recourse. At the municipal level, the ratemaking body is elected—it is the governing body of the municipality—the town board, the common council, etc. Controlling local expenditures for the delivery of services, whether it be the municipal sewer service, the trash removal service, the police and fire service, or the municipal electric, gas, and/or water service, is part of the normal day-to-day activity of local elected officials.

Presently in many instances the same demands apply to utilities with several dozen customers and those with half a million customers.

Although the committee has recommended that municipal utilities be removed from Public Service Commission jurisdiction, such removal would not obviate the need for standards against which the rates for municipal utilities may be judged. Therefore the committee recommends the adoption of legislation granting to the municipality itself the choice of determining whether its utility is to operate on a not-for-profit basis, or whether the municipality is to be permitted the opportunity to earn a return on the investment in that utility. In the former case, the municipality would have the option of utilizing the simpler, cash-based method of recordkeeping. In the latter case, where return is to be based upon the valuation of the rate base, more formalized recordkeeping procedures would be required.

Electric "Bypass." The question of bypass, which was considered by the committee with respect to industrial natural gas users and commercial telephone users, also arose with respect to certain municipalities whose residents presently are customers of an electric supplier whose rates are higher than those of the supplier of an adjoining territory. The committee recommends that the law be clarified, where necessary, to assure that such municipalities may not switch suppliers to those customers without the consent of the current supplier. There is presently a disparity in the rates of the electric utilities in the State. The temptation of customers in an area with high rates is to try to determine a way to pay the lower rates of a neighboring utility. Moving the territorial line is one approach sometimes attempted. Building a private transmission line to the boundary of the neighboring lower-cost utility territory, or contracting with or legally requiring the existing utility to "wheel" the cheaper power in over its own transmission lines, is another method. The problem with each of these approaches is that they ease the burdens on one part of the customer base of the high-cost utility to the detriment of the remaining customers. This committee hopes that its recommendations under the section of this report dealing specifically with electric utilities present a broader solution to the problem of electric rates—one that does not benefit some ratepayers at the expense of others.

The Transportation Division. The committee recommends the transfer of transportation-related responsibilities from the Public Service Commission to the Indiana Department of Transportation. The location of as many transportation-related responsibilities as possible within one governmental agency has appeal and makes sense; it will minimize confusion and maximize coordination within the transportation industry, as well as within various elements of the public sector. Furthermore, implementation of this recommendation, along with the recommendation to eliminate the requirement that the Commission review every municipal utility rate increase, and the recommendation urging a simplified small utilities statute, would allow the Commission to devote significantly increased time and resources to those regulatory matters that have the largest financial impact upon Indiana's citizens. □

Two Commentaries

The Indiana Chamber of Commerce's Position on Economic Dispatch

Lisa Kobe

Director of Public Affairs, Indiana Chamber of Commerce

The Indiana Chamber of Commerce Committee on Energy* has reviewed the topic of economic dispatch and supports the recommendation of the Governor's Committee on Indiana's Utility Future that "the electric utility companies operating in the State of Indiana and the Public Service Commission cause a study to be undertaken with a view toward cooperative centralized economic dispatch."[1]

The recommendation anticipates the results of such a study by September 1, 1985, and a report to the Governor and the legislature by December 1, 1985, presumably to accommodate the development of legislation if study results dictate that legislative action is necessary.

What Is Centralized Economic Dispatch?

Economic dispatch is the dispatch of energy, in this case electric energy, on an economical or lowest-cost basis. In other words, the least costly energy in the pool is dispatched first. In general, Indiana's five investor-owned electric utilities follow this practice within their own individual companies. Each electric utility has its own generating capacity, and the generating plants within the company's system form the company's energy pool.

The establishment of centralized economic dispatch in Indiana would allow the utilities to combine their energy resources to form a statewide power pool. The generating capacity of each utility would be considered a single resource, and "for dispatching purposes the company-wide pool would be replaced by a statewide pool, scheduled and dispatched to assure the most economic mix of generation from the resources available with the total state pool."[2]

Power pools utilizing the economic dispatch concept exist elsewhere in the United States. Some pools operate as formal pools; others are brokerage arrangements, where economy purchases take place without the centralized computer-run dispatching unit. Examples of pools include such Northeast power pools as the New England Power Pool, the New York Power Pool, and the Pennsylvania-New Jersey-Maryland Pool. In the Midwest, several investor-owned utilities in Iowa have formed an economic dispatch system, and American Electric Power operates a company power pool in the Midwest, serving Kentucky, Ohio, Virginia, West Virginia, Tennessee, Michigan, and Indiana.

Although the utilization of power pools in Indiana is not a new concept, the introduction of statewide dispatch would be new indeed.

Examining the Potential of Ratepayer Benefits

Before implementing the concept of economic dispatch, we should determine if such an exercise would result in actual benefits to the ratepayer in the form of lower customer bills. What benefits would a statewide pool give that are not available currently to Indiana consumers?

Economic dispatch theory holds that benefits can be achieved immediately by making low-cost power available to Indiana customers outside of companies' established service territories. The concept suggests that future savings would be realized through lower reserve needs, delayed needs for increased capacity, and joint ownership of new facilities.

In order to consider the desirability of economic dispatch, the committee commissioned R. W. Beck and Associates to perform a planning study to estimate the potential benefits. The study covers the period 1985-94 and compares the projected annual variable costs of electric energy under economic dispatch with the operating costs under the current system.

Indiana's electric utilities contracted a study with Stone and Webster Management Consultants, Inc., to review the impact of economic dispatch in Indiana; this study uses the same 1985-94 planning period. Both studies exclude the generating resources of the Indiana and Michigan Electric Company (I&M) because these resources are already part of the American Electric Power system. The studies did assume that the transmission resource of I&M would be available to the Indiana pool.

Both studies indicate that the dispatching order under statewide centralized economic dispatch would increase the loads of SIGECO, PSI, and IPL and would decrease dramatically NIPSCO's current load requirements. SIGECO, PSI, and IPL would still be obligated to meet the requirements of their own service areas; their excess generating capacity would also be required to dispatch power to other service areas. These studies did not take into account the availability of additional low-cost coal to the three companies.

The availability of the lower-cost power would provide an immediate benefit to those ratepayers who currently pay for higher-cost energy. However, the impact on the current customers of the utility that would sell the lower-cost power should be carefully evaluated. These customers would not lose immediately the benefit of being served lower-cost energy. However, a pooling arrangement ought to consider whether the generating facilities of these utilities would be worn out much more quickly, resulting in a substantial loss of long-term benefits to existing customers.

Nor was consideration given in these studies to the possibility of future acid rain legislation or other environmental considerations. The savings produced by a statewide pool would come from plants

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*The Indiana Chamber of Commerce Committee on Energy is chaired by Dr. Steven Beering, president of Purdue University, and is composed of 12 other members, who represent industrial users of electricity and the five investor-owned electric utilities in Indiana.

[1] Report of the Governor's Committee on Indiana's Utility Future, December 1984.

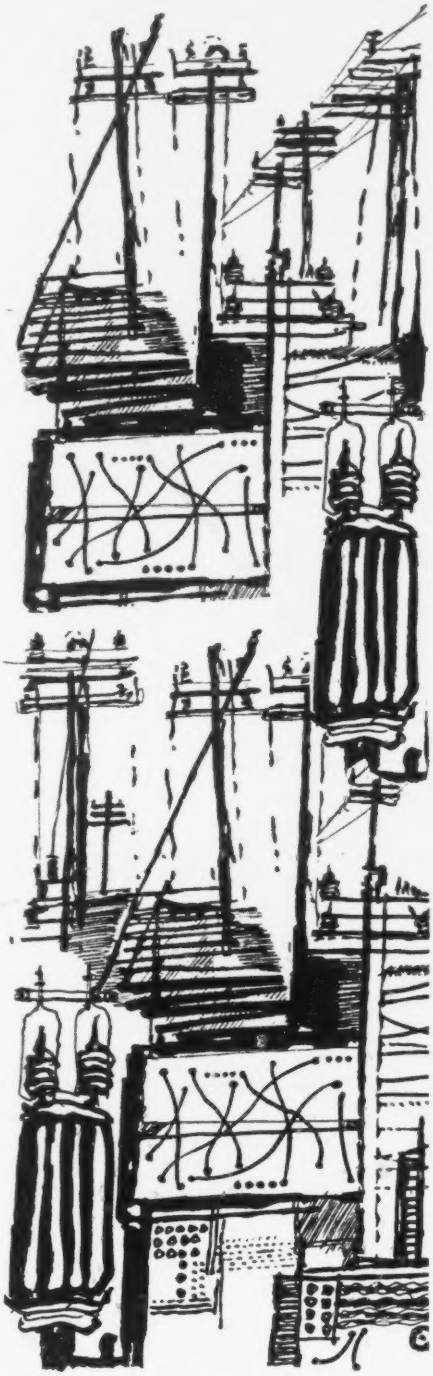
[2] Report of Governor's Committee.

A Comparison of R. W. Beck and Stone and Webster

Present Value of 1985-94 Savings/(Penalty)
(Expressed as Millions of January 1985 Dollars)

	R. W. Beck	*Stone and Webster*
Operating Costs Under Current Operations	$7,560	$7,479
Operating Costs Under Centralized Economic Dispatch	$6,859	$6,905
Reductions in Operating Costs	$ 701	$ 574
Deductions		
Capital Costs of System	$ 18	$ 14
Operating Costs of System	$ 8	$ 10
Wheeling Costs	$ ----	$ 72
Transmission Losses	$ ----	$ 30
Contract Cancellations	$ ----	$ 527*
Total Deductions	$ 26	$ 653
Net Savings	$ 675	$ (79)

*NIPSCO's estimate of minimum cost to cancel coal contracts in January 1985 dollars. R. W. Beck study does not include this cost consideration.



that would have to be modified (that is, the SIGECO, PSI, and IPL plants) if proposed acid rain legislation is adopted.

The studies disagree somewhat as to the potential savings this rearrangement of energy dispatch would produce (see Table above[3]). The R. W. Beck study estimates total aggregate savings, expressed in nominal dollars, of $1.4 billion over the planning period. The Stone and Webster study indicates a reduction in costs of $1.2 billion over the same period, but its estimates of costs for capital, operation, wheeling, transmission losses, and the costs of contract cancellations indicate that the system would operate at a $79 million loss over the same period.

Both the R. W. Beck and Stone and Webster studies predict similar capital and operating costs of a computer-run centralized economic dispatch center. The primary difference in the final outcome results from the treatment of the other cost considerations described as deductions in the table. These cost considerations ought to be reviewed further. For example, savings might be achieved if, instead of establishing a dispatch center, the same dispatching arrangement could be made through brokerage arrangements. In addition, the costs associated with wheeling, transmission losses, and contract cancellations should be studied further to see if they can be minimized.

Neither study should be viewed as a definitive statement on economic dispatch in Indiana. The Indiana Chamber Committee on Energy, composed of members representing both electric energy producers and users, believes that the results of both studies generate sufficient interest to support the Governor's Committee's conclusion that the issue be reviewed further. Any future study ought to include considerations that have not been addressed by either study, such as (1) environmental concerns, including possible acid rain legislation; (2) the cost and availability of coal supply; (3) alternatives for operation and transmission; (4) and alternatives for state and regional pooling. It is critical that the cost considerations and actual savings be investigated more thoroughly and compared to the costs of operating the current system. □

[3] "Review of R. W. Beck," Stone and Webster Management Consultants, Inc., January 7, 1985.

A Consumer View from the Citizens Action Coalition

David Culp

Energy Campaign Director, Citizens Action Coalition of Indiana

During the last few years, consumers and businesses have been stung by utility rate increases that seemingly defy justification. Many consumers, involved in utility matters for the first time, have demanded reforms in the way utilities, especially electric utilities, are regulated. This statewide concern led to the establishment of the Governor's Committee on Indiana's Utility Future. The main focus of its report and of my remarks is electric utilities.

The committee deserves high marks for questioning the traditional assumptions of the industry, which has been shielded from competitive pressures, and its regulators. The old system of planning for the State's electric future simply has not worked. Consider the events of the last 15 months:

- A group of five business executives appointed by the Governor concluded that the State's largest power plant was too expensive, not needed, and should be cancelled—after $3 billion was spent.
- After an investigation by the Public Service Commission, the State's second largest utility agreed to permanently remove $42 million in cost overruns from the rate base of its most recent power plant.
- Two major electric utilities admitted to the PSC that they have—and will have for at least the next 15 years—excess generating capacity.
- Because of constructions debts, one electric utility is now in default and another is discussing the unthinkable—bankruptcy.

Power Plant Approvals

Both customers of and investors in Indiana's electric utilities suffer from the PSC's method of reviewing new plant construction. Only when a project is completed and after the expenditure of hundreds of millions of dollars does the PSC determine whether the project was ever needed. Only at the end of a four- to eight-year construction period is there any examination of records to determine what should be approved for inclusion in the utility's rate base.

The committee's recommendation would require the PSC to review *during construction* both the need for and the costs of a power plant. This would reduce risk for both ratepayers and investors. Ratepayers would have better assurance that they are paying only for what they need. Investors would know that the chances of a major surprise at the end of a construction project are reduced or eliminated.

Future Electric Supply

For meeting future electrical demand, the report recommends that less capital-intensive options be pursued. These include plant refurbishment, conservation, load management, and cogeneration. With shorter lead times than regular new plant construction, these options provide a utility with greater flexibility in meeting changing market demands. When new plants are needed, the committee suggests capacity be added in smaller increments, either by building smaller plants or through joint ownership by several electric utilities in the State. A strategy of smaller increments of capacity and of joint ownership of new plants has an inherent advantage over massive construction projects undertaken by a single utility. Financing is less burdensome, and there is less risk that the plants will not be completed and placed in the rate base.

All the committee's suggestions have been successfully adopted in other states. What is new is the recognition by State officials that these methods could also provide benefits to Indiana ratepayers.

Rate Shock and CWIP

"Rate shock" is the term given sharp rate increases when a new power plant comes on line and is included in the utility's rate base for the first time. With four new coal-fired power plants coming on line in Indiana during the next three years, there is concern about the impact of the expected rate increases on the State's economic health. The committee examined several financing alternatives that address this problem. Of the options surveyed, joint construction and ownership by several utilities of new facilities would have the lowest cost to consumers over the long run. Adding smaller increments of capacity to a utility's system provides a better match of supply and demand and less abrupt price increases.

Construction Work in Progress, or CWIP, has been a subject of intense debate in this State for the last six years. Because of the strong public sentiment against prepayment of utility construction costs, Governor Orr did not endorse the committee's recommendation of CWIP. The issue will not be considered by the General Assembly this year. Without going through all the arguments against this financing arrangement for new construction, I would simply point out that, according to the full report, in real dollars CWIP is probably the *least* costly financing alternative from the perspective of a utility but the *most* costly alternative for the consumer.

Operating Incentives

Today, the Public Service Commission does not measure operating effectiveness as part of the rate setting process. The report recommends that the PSC adopt goals for future operating costs in each rate case. This system of incentives would allow those that performed better than the goals to retain the financial rewards, while those that underperformed would be penalized. This incentive program should keep operating costs down—which would keep rates down. It would require a larger and more sophisticated PSC staff than we have today.

Statewide Power Pool

The engineering study commissioned by the committee confirmed that better day-to-day coordination of existing power facilities in Indiana could translate into significant cost savings for ratepayers. A power pool would allow Indiana's electric utilities to engage in what is called "statewide economic dispatch." Simply stated, those power plants in the State with the lowest operating costs would be used most, while those with the highest operating costs would be used perhaps only one or two days a year during peak demand. The electric utilities now use economic dispatch *within* each of their own systems. The committee concluded that substantial reductions in operating costs—perhaps as much as $1.4 billion in the next ten years—could be accomplished if this practice were expanded on a statewide basis. However, because of strong opposition from the utilities, the committee recommended no action but that yet another study be undertaken.

Indiana's Present Problems

The committee decided not to deal with some of the State's current problems. It made no recommendations concerning the excess generating capacity of some utilities, an excess that has caused extremely high electric rates. It left the financial problems of the utilities involved in Marble Hill to be solved by the PSC. Given the time limitations, these omissions are not surprising; short-term issues are more controversial, and it is harder to produce consensus positions on them.

Conclusion

This report provides a framework for restructuring utility regulation in Indiana. Most of its ideas are not new but are borrowed from other states. Although they will not provide any immediate rate relief, they would hold down the State's energy prices in the future. What is lacking are specific details about implementing these suggestions. We predict that, without a strong push by Governor Orr's staff, the results of this study committee are likely to gather dust at the Public Service Commission and the General Assembly until there is another "utility crisis." □

Home Heating Fuels in Indiana

John Spellman

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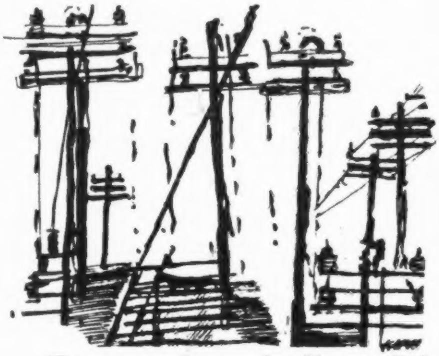
Electricity is used for heating one of every six Hoosier households. The discussions about electric energy and its costs are more important today than they were a decade ago because electricity was the second fastest growing energy source for home heating in the decade from 1970 to 1980. The energy source with the highest growth rate was wood; however, its market penetration is still far below electricity's. See **Table 1** for a comparison of heating fuels in 1970 and 1980.

Concern about regulated energy rates—electric and piped utility gas rates—is not evenly distributed across the state. More than 30% of the homes in Jefferson, Blackford, and Jennings counties rely on electricity, compared to a state average of 16.4%. In eleven counties, less than 10% of the homes are heated with electricity.



The range of use of utility-supplied energy is even greater for users of gas. In Lake, Porter, Vanderburgh, and LaPorte counties more than 80% of the homes heat with utility gas. In Brown and Union counties, less than 6% use that source for heating. **Table 2** indicates the percentages of homes in each county that use either electricity or utility gas. Added together, these two numbers indicate the percentage of homes that depend on regulators to set standards for service and price. □

Table 1

Heating Fuels of Indiana Housing Units, 1970 and 1980

Type of fuel	*1970*		*1980*		
	Number	*Percent distribution*	*Number*	*Percent distribution*	*% change 1970-80*
Total occupied units	1,609,494	100.0	1,927,050	100.0	19.7
Utility gas	917,316	57.0	1,173,561	60.9	27.9
Fuel oil	433,271	26.9	256,803	13.3	– 40.7
Coal or coke	54,642	3.4	9,083	0.5	– 83.4
Wood	5,848	0.4	45,843	2.4	683.9
Electricity	94,824	5.9	315,677	16.4	232.9
Other gas	95,823	6.0	121,829	6.3	27.1
Other sources or none	7,770	0.5	4,254	0.2	– 45.3

Source: U.S. Bureau of the Census and INDIRS.
Note: Percentages may not add to 100 because of rounding.

Table 2

Percent of Occupied Dwelling Units Using Electricity or Utility Gas, by County, 1980

County	*Percent electric*	*Percent utility gas*
Adams	26.6	41.5
Allen	20.8	69.1
Bartholomew	21.4	56.4
Benton	8.0	52.1
Blackford	31.0	45.9
Boone	21.8	38.7
Brown	28.7	5.7
Carroll	19.0	39.8
Cass	9.0	68.3
Clark	22.2	54.5
Clay	19.9	36.9
Clinton	11.3	51.3
Crawford	15.2	12.9
Daviess	15.2	51.1
Dearborn	24.1	37.5
Decatur	23.2	38.2
Dekalb	19.6	44.6
Delaware	24.2	63.3
Dubois	22.3	43.0
Elkhart	9.1	73.1
Fayette	15.9	49.7
Floyd	18.9	54.4
Fountain	9.2	46.9
Franklin	18.3	15.0
Fulton	15.4	41.3
Gibson	15.7	52.4
Grant	24.2	61.5
Greene	15.7	42.7
Hamilton	27.6	45.3
Hancock	21.1	50.9
Harrison	22.3	14.9
Hendricks	24.8	29.7
Henry	15.1	56.7
Howard	16.1	76.7
Huntington	17.7	47.7
Jackson	26.4	41.9
Jasper	16.0	43.7
Jay	22.8	47.2
Jefferson	32.0	32.4
Jennings	30.7	18.7
Johnson	19.2	58.0
Knox	16.2	66.2
Kosciusko	11.6	58.2
Lagrange	13.4	28.1
Lake	5.5	85.7
LaPorte	6.0	80.1
Lawrence	18.7	51.2
Madison	18.5	69.5
Marion	16.6	69.1
Marshall	9.0	59.6
Martin	16.3	31.5
Miami	11.5	63.4
Monroe	27.5	48.8
Montgomery	14.9	43.2
Morgan	24.6	32.7
Newton	13.9	40.4
Noble	21.0	38.7
Ohio	24.3	17.8
Orange	14.1	37.4
Owen	21.2	13.3
Parke	17.5	39.2
Perry	12.6	55.7
Pike	16.6	31.0
Porter	7.3	84.0
Posey	17.6	36.5
Pulaski	7.8	44.3
Putnam	18.2	36.9
Randolph	28.7	42.9
Ripley	23.3	24.7
Rush	15.3	33.9
St. Joseph	10.5	78.1
Scott	25.6	27.9
Shelby	17.2	41.1
Spencer	17.3	44.2
Starke	3.4	60.1
Steuben	14.0	35.8
Sullivan	16.8	44.8
Switzerland	21.9	12.5
Tippecanoe	19.6	59.5
Tipton	17.5	48.5
Union	19.3	.2
Vanderburgh	12.5	82.0
Vermillion	15.3	46.3
Vigo	17.1	59.3
Wabash	16.2	54.4
Warren	13.0	22.6
Warrick	23.7	51.7
Washington	21.2	20.1
Wayne	16.3	45.0
Wells	19.2	50.2
White	9.6	66.3
Whitley	26.0	40.6

Source: U.S. Bureau of the Census and INDIRS.

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Leslie P. Singer and Edith Allen-Schult **Expenditures on Higher Education and Economic Growth in Manufacturing**

Yochanan Shachmurove **Changes in the Dependence of State Employment on National Employment in the Last Decade: Some Evidence or When the U.S. Economy Sneezes, Does Indiana Catch Cold?**

Morton J. Marcus **Recession and Recovery Revisited**

In this issue . . .

If you have read these pages for enough years, you will note that the topics in this issue are not new. That does not detract from their value. The same questions arise throughout our lives, with new data and new techniques to answer them.

What is the contribution of education to our society, our state, and our community? That question reoccurs whenever basic values are being measured against the costs of realizing their achievement. Leslie Singer and Edith Allen-Schult offer an important addition to this critical dialogue in their article on education's contributions to economic welfare.

How do the changes in our state compare with the changes that are sweeping through the national economy? Yochanon Shachmurove examines Indiana's employment in the light of national structural changes.

All economists spin their webs from available data. The last article in this issue reexamines the recession and recovery in the light of new data.

We have no doubt that future issues of this publication will address the same questions again . . . and yet again.

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Expenditures on Higher Education and Economic Growth in Manufacturing

Leslie P. Singer and Edith Allen-Schult

Leslie P. Singer is professor and coordinator of economics on the Northwest campus of Indiana University, where Edith Allen-Schult is a visiting assistant professor of economics. The authors express their appreciation to Gary A. Lynch for valuable guidance and to John Soltys for data collection.

Is there a relationship between expenditures on higher education and investment in manufacturing? For equal proportionate increases in new capital and higher education expenditures, do management personnel, management payrolls, and the growth rate of value added tend to rise more than proportionately? Are growth industries more likely to locate in those states that spend more on higher education? These are some of the questions that this study seeks to answer.

Although this article does not deal specifically with the State's economy, the findings of this national study are likely to have significant implications for Indiana. The implications are particularly relevant to northern Indiana, where a major effort at stimulating economic growth in manufacturing is underway.

Since the Nobel Prize-winning contributions of Theodore Schultz in the 1960s,[1] the impact of education on labor productivity has been analyzed in more than two thousand articles. However, few authors deal specifically with higher education, and none deal with the special relationship between investment in growth industries and expenditures on education.

Moreover, the optimistic findings of Denison and Jorgenson,[2] who in 1974 reported that education added between .65 and .71% to the U.S. real economic growth rate in 1947-69 and 1971-74, have been called into question by the more recent findings of others. Peter Chinloy states, for example, that "quality change in the U.S. labor market almost disappeared" and that "the main effect for education declined by over one-fifth between 1959-63 and 1971-74."[3]

Our study differentiates between the contribution of all levels of education to labor productivity in general, a contribution that may have declined, and the contribution of higher education and higher level skills to more output through the production of technical personnel and management. Our focus is on the interaction between technologically advanced investment such as occurs in growth industries and the number and quality of personnel who manage and maintain the technologically advanced capital.

We assume that private and public expenditures on higher education are, in terms of a theory of large numbers, an appropriate measure of quality.

We contend that the measures of the contribution of education to productivity and growth are biased by the fact that capital and general labor tend to be marginally *substitutes*, whereas technologically advanced capital and technically knowledgeable management tend to be marginally *complements*.

In an open hearth shop the melter, the first helper, and his crew do not need advanced university education. Basic literacy, on-the-job training, and basic arithmetical competence will enhance their productivity greatly. In an up-to-date basic oxygen process, some of the manual jobs are taken over by machines. However, trained technical personnel must be hired to direct the computer-programmed operations. As this case illustrates, automation, which substitutes physical capital for labor, reveals the need for professionally-trained management and technical experts. Therefore, in modern industrial economies, the labor with higher education is complementary to, not a substitute for, new physical investment.

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[1] Theodore W. Schultz, "Investment in Human Capital," *American Economic Review*, March 1961: 1-17.

[2] Dale W. Jorgenson and Zvi Griliches, "The Explanation of Productivity Change," *Review of Economic Studies*, July 1967: 249-283; Edward F. Denison, *Accounting for United States Economic Growth 1929-1969* (Washington, D.C., 1974); Denison, "Accounting for Slower Growth, an Update," in *International Comparison of Productivity and Causes of Slowdown*, ed. John W. Kendrick (Cambridge, Mass.: Ballinger, 1984): 1-54.

[3] Peter Chinloy, "Sources of Quality Change in Labor Input," *American Economic Review*, March 1980: 108-119.

The most direct impact of higher education is to supply a steadily rising proportion of society's decision makers and technical experts. According to human capital theory, the human capital added through education shows itself in higher lifetime earnings.[4] Our hypothesis is that higher education imparts the human capital required, except for rare cases, for managerial and professional jobs. This human capital shows itself not only in higher salaries but also in making physical capital work more productively.

The most direct impact of higher education is to supply a steadily rising proportion of society's decision makers and technical experts.

"General knowledge," also has an economic impact.[5] Higher education not only maintains "general knowledge" but increases it as well. As part of disembodied productivity growth, education has effects that go beyond embodiment in physical and human capital. It may have a direct effect on output.

We submit that, while there may be *diminishing* returns to years of education and vocational training, there appear to be *increasing* returns to expenditures on higher education, defined as total expenditures on public and private university and four-year institutions of higher learning. Moreover, returns to higher education are significantly greater in growth industries.

We intend to substantiate the foregoing proposition in four simple steps. We shall show that:

1. For equal proportionate increases in new capital and higher education expenditures, management personnel tend to increase more than proportionately.

2. For equal proportionate increases in new capital and higher education expenditures, management payrolls tend to rise more than proportionately.

While there may be diminishing *returns to years of education and vocational training, there appear to be* increasing *returns to expenditures on higher education.*

3. For equal proportionate increases in new capital and higher education expenditures, the growth rate of value added in the 13 fastest growing industries is significantly higher than in all manufacturing, in statistical terms.

4. The share of growth industry—and the probability of attracting growth industry—is relatively higher in states that spend proportionately more on universities and other four-year colleges.

1. For equal proportionate increases in new capital and higher education expenditures, management personnel tend to increase more than proportionately.

An increase in new capital formation creates demand for management personnel. Expenditures on higher education generate the supply of management in terms of both quantity and quality. We observe the intersections of these short-run supply and demand curves in a so-called "steady state" supply function, which is estimated in this article for 1975-78.[6]

We picked the years from 1975 to 1978 because the period appears to be as close as we may ever get to an equilibrium path. This is particularly important because, if the economy is in the throes of cyclical instability, short-run shifts in aggregate demand will distort the relationship between net capital formation and value added. Management and labor are hoarded, and the accelerator causes wide swings in net investment.

For each of the years from 1975 to 1978 and for each of the 50 states, we matched value added in manufacturing, manufacturing payrolls, manufacturing employment, and net capital formation with general educational expenditures by all public and private universities and other four-year colleges. We used net capital formation from the Census of Manufactures, which is a more accurate measure than the investment reported in the National Income Accounts (which includes consumer durables).

We specified a cross-section regression in logarithmic form. The theory behind this specification is that there exists a steady relationship between value added, employment, investment, and education. Each state of the Union provides a random observation of this relationship for each of the years from 1975 to 1978. States vary in size and in mixture of industries. The mixture of public and private educational institutions also varies. Consequently, if a stable and statistically significant relationship were to be found, this would not be an inconsequential result.

One would assume that, as time progresses and as U.S. manufacturing expands, regions with lower levels of value added in manufacturing would close the gap separating them from regions which currently show higher levels of value added in manufacturing and higher levels of net capital formation at a constant rate. Moreover, the cross-section estimating approach of the steady state growth function obviates the often intractable problem of correctly deflating capital and product series in periods of unpredictably rising price levels.

Our results are presented in four tables. In **Table 1** we give the partial regression coefficients, the t-statistics, and the adjusted R-squared for management employment in manufacturing as explained by net capital formation and expenditures on higher education.

Economists refer to increasing returns as a situation where output rises proportionately more than inputs. The output in Table 1 is management personnel along a steady state function. Universities and other four-year colleges are the input for

[4] Theodore W. Schultz, *The Economic Value of Education* (New York: Columbia University Press, 1963).

[5] Edward F. Denison, *Sources of Economic Growth in the U.S. and the Alternative Before Us*, Supplementary Paper No. 13 (New York: Committee for Economic Development, 1962).

[6] Robert A. Pollak, "Habit Formation and Dynamic Demand Functions," *Journal of Political Economy*, July-August 1978: 745-763.

Table 1

Partial Regression Coefficients:
Percent Change in Management Employment for a 10%
Rise in Net Investment and 10% Rise in Expenditures for Higher Education

	Proportionate Change in Employment	*Proportionate Change in Net Investment*	*Expenditures for Higher Education*	D_1 *Eastern Region*	D_2 *Midwest Region*	D_3 *Southern Region*	D_4 *Western Region*	*Adjusted* R^2
1978	12.842% =	.485 (10%)	+ .799 (10%)	- 8.989	- 9.227	- 9.253	- 9.531	.99
T-Stat		5.381	6.867	8.647	8.874	9.107	9.305	
1977	12.010% =	.446 (10%)	+ .755 (10%)	- 8.004	- 8.310	- 8.442	- 8.616	.99
T-Stat		4.044	5.577	6.918	7.187	7.645	7.659	
1976	12.698% =	.355 (10%)	+ .914 (10%)	- 9.493	- 9.706	- 9.766	-10.033	.99
T-Stat		3.036	6.644	8.188	8.347	8.790	8.820	
1975	11.232% =	.646 (10%)	+ .477 (10%)	- 5.559	- 5.693	- 6.024	- 6.367	.99
T-Stat		7.034	4.780	6.524	6.730	7.332	7.485	

advanced technical education, and new capital is the input which creates the jobs for the new managers.

If a 10% increase in expenditures on higher education and in new capital formation is predicted to raise management employment more than 10%, we are observing increasing returns to inputs. In other words, we are getting a slightly bigger bang for our educational buck.

If a 10% increase in expenditures on higher education and in new capital formation is predicted to raise management employment more than 10%, we are observing increasing returns to inputs. In other words, we are getting a slightly bigger bang for our educational buck.

Technically, we realize increasing returns whenever the sum of the partial regression coefficients for the inputs—net capital formation and expenditures on higher education—add up to more than one. Moreover, the individual regression coefficients indicate the relative contribution of each input.

We note that the relative contribution of educational expenditures appears to rise for the four years studied.

The coefficients for the four regions into which we have divided the 50 states are for dummy variables. We forced the regressions through the origin; thus, the dummies represent intercepts for each region. In other words, for Indiana, which is in the Midwest, only the second of the intercept columns is relevant; all other regional coefficients are zero. For California only the column coefficients captioned "West" would apply; all others are zero.

For this study all 50 states are in one of four regions. The Plains states are boundaries of three regions, with Texas in the West, Louisiana and Arkansas in the South, and Kansas through the Dakotas in the Midwest. The lowest values of the regional coefficients were consistently in the West, not only for management employment (Table 1) but also for management payroll (Table 2), implying that management starts from a lower base in the West than anywhere else, with the Midwest in the middle. These coefficients represent logarithms of the dependent variables, so that even small differences are meaningful. For value added (Tables 3 and 4) regional rankings are more mixed. The Midwest starts highest for six of the eight cases; it is barely overtaken by the South in the other two.

The regional dummies indicate that differences between the regions are statistically significant. Note that the t-statistics are two to ten. This means that the probability of no relationship is less than 5% and that the errors in the coefficients are one-half to one-tenth the size of the coefficients themselves. We note that all t-statistics are significant. T-statistics are not linearly related; consequently, a t-statistic of 8 does not imply a statistical significance much greater than a t-statistic of 2.

2. For equal proportionate increases in new capital and higher education expenditures, management payrolls tend to rise more than proportionately.

Table 2 is of the same design as Table 1, except that output—the dependent variable—is not management employment but management payroll.

We may assume that management earns its marginal product. Consequently, if payrolls rise more rapidly than employment, the difference in growth rate can be attributed to an increase in quality of inputs.[7] Clearly, increasing returns are reflected in the steady state functions reported in Table 2. The t-statistics are robust and the R-squared are high. The relative contribution of higher education tends to rise, over time, though not monotonically. Regional differences, which might reflect differences in industry mix, among other things, are statistically important.

[7] See Chinloy.

Table 2

Partial Regression Coefficients
Percent Change in Management Payroll for a 10% Rise in Net Investment and 10% Rise in Expenditures for Higher Education

	Proportionate Change in Payroll	*Proportionate Change in Net Investment*	*Expenditures for Higher Education*	*D_1 Eastern Region*	*D_2 Midwest Region*	*D_3 Southern Region*	*D_4 Western Region*	*Adjusted R^2*
1978	12.788% =	.531 (10%)	+ .748 (10%)	-5.647	-5.935	-6.053	-6.171	.99
T-Stat		6.171	6.736	5.692	5.982	6.243	6.314	
1977	12.251% =	.546 (10%)	+ .679 (10%)	-4.787	-5.048	-5.372	-5.423	.99
T-Stat		4.641	4.705	3.864	4.094	4.562	4.521	
1976	13.317% =	.453 (10%)	+ .879 (10%)	-6.815	-7.105	-7.279	-7.407	.99
T-Stat		3.619	5.975	5.500	5.717	6.130	6.092	
1975	11.711% =	.719 (10%)	+ .452 (10%)	-2.938	-3.188	-3.626	-3.770	.99
T-Stat		7.526	4.351	3.314	3.623	4.244	4.260	

3. For equal proportionate increases in new capital and higher education expenditures, the growth rate of value added in the 13 fastest growing industries is significantly higher than in all manufacturing, in statistical terms.

In Table 3 we measure the leverage of higher education expenditures on value added. Along an equilibrium growth path one would expect product and new capital to grow at roughly equal rates if technology and productivity are constant (no substitution of capital for labor).

Besides supplying the necessary technical personnel to manage the advanced new capital, higher education expenditures also reflect the advances in the state of knowledge embodied in new capital formation.

If the coefficient of LI, the logarithm of investment, is one and of education, E, is zero, we have the constant technology equilibrium path with no quality effect. In reality the coefficient of new investment, LI, is likely to be lower than unity, because not all new capital will be used to raise value added; some of the new capital will be employed as a substitute for labor.

The specification in Table 3 is somewhat different from that of Tables 1 and 2

Table 3

Partial Regression Coefficients for Value Added in Manufacturing

	Dependent Variable: Value Added	*Proportionate Change in Net Investment*	*Expenditures for Higher Education*	*D_1 Eastern Region*	*D_2 Midwest Region*	*D_3 Southern Region*	*D_4 Western Region*	*Adjusted R^2*
1978	LY	.813 (LI)	.00359 (E)	3.586	3.578	3.614	3.214	.998
T-Stat		12.581	2.979	9.709	9.300	8.906	9.641	
1977	LY	.877 (LI)	.00310 (E)	3.212	3.229	3.032	2.781	.999
T-Stat		15.376	2.715	10.507	9.806	8.372	9.507	
1976	LY	.952 (LI)	.00283 (E)	2.686	2.762	2.551	2.360	.998
T-Stat		13.134	1.974	6.905	6.694	5.640	6.447	
1975	LY	.915 (LI)	.00236 (E)	2.902	2.988	2.764	2.450	.998
T-Stat		17.175	2.384	9.728	9.564	8.192	9.319	

LY: Logarithm of value added (in millions of dollars)
LI: Logarithm of net investment (in millions of dollars)
E: Total expenditures on universities and other four year colleges (in units of ten million dollars)
D: Regional Dummies. D=1 if state is in region, zero otherwise.

Source: Census of Manufactures, Census of Education

The dependent variable is the natural logarithm of value added, LY. New capital formation is in logarithms; however, higher education expenditures, E, are stated in scalars.

The coefficients of E are the exponents of the growth term e, namely the Napierian base. In other words, in 1978, for each unit of higher education expenditures, total value added is leveraged about 3.6% because of higher education expenditures alone.

Another way of putting it is that, if new capital formation rises by (let us say) 10%, the quality of new investment is not affected by higher education expenditures if the regression coefficient of E in Table 3 is zero. In that case, no matter how much E rises, growth in value added will be affected only by growth of investment and possibly by other factors that are contained in the regional dummies D_1, D_2, D_3, or D_4. If the regression coefficients for E exceed zero, each dollar of new capital will be enhanced by higher education expenditures, which are a proxy for quality and the state of knowledge.

In Table 3 the leverage of higher education rises monotonically over time.

We must note that the regression specification in Table 3 is not a production function. That would require capital stock, labor, and energy as arguments and a modified CES or translog specification[8] and nonlinear parameter estimation.[9]

Holding the effect of capital formation and region constant, we can use the relationships in Tables 3 and 4 to calculate the average rise in value added that can be induced by one unit of expenditure on higher education—for example, ten million dollars. We also can calculate the average increase in payroll. This allows us to estimate the prospective gross tax revenue generated by a unit of expenditure on higher education. It appears that, at the margin, Indiana may get back three tax dollars for each real dollar spent on higher education. This is true only on the equilibrium path, not during a cyclical downswing.

Table 4

Partial Regression Coefficients for Growth Industries
Dependent Variable: Value Added in 13 Growth Industries/Value Added in Manufacturing

	Expenditures for Higher Education	*D_1 Eastern Region*	*D_2 Midwest Region*	*D_3 Southern Region*	*D_4 Western Region*	*Adjusted R^2*
1978 LG/Y =	.00478 (E)	- 3.407	- 2.404	- 2.595	- 2.932	.849
T-Stat	2.068	9.099	6.930	7.876	9.672	
1977 LG/Y =	.00599 (E)	- 3.266	- 2.281	- 2.468	- 2.765	.840
T-Stat	2.052	8.854	6.673	7.627	9.367	
1976 LG/Y =	.00754 (E)	- 4.206	- 3.283	- 3.281	- 3.948	.896
T-Stat	2.675	10.645	9.018	9.577	12.508	
1975 LG/Y =	.00760 (E)	- 3.970	- 3.059	- 3.078	- 3.960	.894
T-Stat	2.967	(10.912)	9.027	9.389	12.258	

LG/Y: Logarithm of the ratio of: Value added in growth industries over value added in all manufacturing.

Growth industries are: petroleum products; agricultural, industrial organic and inorganic chemicals; nonferrous metals; computing, farm and garden, construction and general industrial machinery; electrical equipment; ship building; measuring devices; and medical instruments.

E: Expenditures for universities and other four-year colleges.

D_1-D_4 are regional dummy variables.

The null hypothesis that higher education expenditures do not increase the probability that growth industries will locate in a state is *rejected* for all years between 1975-78.

The mix of growth industries will, of course, change over time, yet the conclusion that higher education expenditures attract growth industries is likely to hold.

> *It appears that, at the margin, Indiana may get back three tax dollars for each real dollar spent on higher education.*

4. The share of growth industry—and the probability of attracting growth industry—is relatively higher in states that spend proportionately more on universities and other four-year colleges.

Table 4 addresses the question whether, in statistical terms, the share of growth industries captured by a state is significantly related to that state's expenditures on higher education relative to other states. If we denote the location of a growth industry in a state as an event, the proportion of such events relative to all other entries by other manufacturing reflects the odds-on probability that a randomly selected state will attract growth industries.[10]

The null hypothesis is that in this case higher education expenditures do not affect odds-on probabilities and that selection of location is purely geographical, as measured by the four regional dummies.

Table 4 shows that the odds-on probability of attracting growth industries significantly increases with rising expenditures on higher education. Moreover, the leverage of higher education expenditures is almost double that of industry in general.

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[8] Timothy J. Considine and Timothy J. Mount, "The Use of Linear Logit Models for Dynamic Input Demand Systems," *The Review of Economics and Statistics,* August 1984: 434-443.

[9] James M. Griffin and Paul R. Gregory, "An Intercountry Trans-Log Model of Energy Substitution Responses," *American Economic Review,* September 1976: 845-857; and Jacques R. Artus, "The Disequilibrium Real Wage Rate Hypothesis: An Empirical Evaluation," *International Monetary Fund Staff Papers,* June 1984: 249-302.

[10] See Considine and Mount.

The regional dummy variables are, of course, negative because probabilities cannot exceed one; if the exponent is zero, the probability is one. The results of Table 4 are possibly the most compelling indications of higher education expenditures.

Conclusions

The present study used several measures of higher education expenditures, such as spending at private and public colleges and universities and the differences between expenditures and tuition fees. The results were generally in keeping with those reported in Tables 1 through 4.

The cross-section approach relates all variables to each other in the same dollars and also measures real growth of value added and payrolls along a steady state function. The t-statistics and adjusted R-squared are so robust throughout that there is practically zero probability that the observed relationship might have been due to chance. Our findings suggest the following conclusions.

1. Our findings support the view that *quality* is the next frontier for Indiana and the nation. As reindustrialization of the country and the State proceeds, new and more advanced capital gradually will replace the existing stock. To prosper, states need net investment. In turn, this phenomenon will tend to raise the ratio of skilled or educated management and technical personnel to production workers.

2. On the supply side, this implies that expenditures on higher education may have to rise more rapidly than general education expenditures.

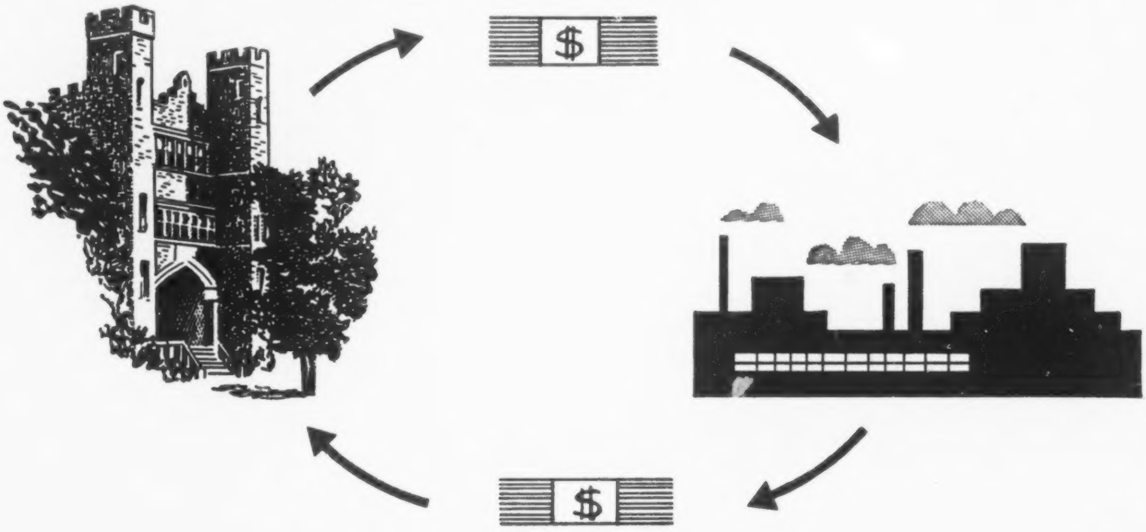
3. State expenditures on higher education enhance the quality of new additions to capital manufacturing. Higher education tends to increase value added more than proportionately.

4. New capital formation by firms requires an increase in qualified management. Higher education institutions must meet this rising demand to prevent bottlenecks that may retard growth of industry.

5. Industries that are at the cutting edge of economic growth—and, therefore, have a greater than usual demand for high quality—appear to be attracted to states that strongly support higher education more than to states that do not. Other things being equal, the leverage of expenditures on higher education is almost twice as high for growth industries as compared to manufacturing in general.

6. These findings suggest that growth industries are more likely to locate in states that spend more on higher education. The regional differences give the Midwest a slight edge, but the education effect is large enough to dominate regional effects, as California and Massachusetts show.

7. Using the figures for Indiana in 1978 for illustrative purposes, we can show that, during a period of steady economic growth, an extra $10 million (1978$) expenditure on public and private universities and four-year colleges is likely to raise management payrolls in manufacturing alone by $140 million (1978$). The total impact of this increased spending on education—including more management payroll, increased value added in manufacturing, and more growth industry—may be expected to raise the yield from taxes on income and sales by at least $30 million (1978$). Management and technical personnel who are direct beneficiaries of higher education subsidies return a surplus over costs to the state. In this manner, colleges and universities help defray the state cost of social programs that benefit those who derive no direct gains from expenditures on higher education. ☐



Changes in the Dependence of State Employment on National Employment in the Last Decade: Some Evidence; or, When the U.S. Economy Sneezes, Does Indiana Catch Cold?

Yochanan Shachmurove

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This article is part of ongoing research concerning the relationship between the Indiana economy and the national economy. It (1) looks into the structural changes that the Indiana economy has undergone in the last decade, (2) examines the development and performance of the Indiana economy to give a perspective on current economic conditions in Indiana, and (3) investigates the changes in the relationship between the national economy and the Indiana economy. Different sectors of the Indiana economy are compared to their national counterparts in order to ascertain the structural changes that have occurred across sectors of the Indiana economy. This article investigates 24 sectors of the Indiana economy today and compares their current interrelationships to those that existed a decade ago.

The Models Used

The study used two regression methods to examine these relationships: the Vector Auto Regressive (VAR) model and the stepwise model.

VAR is a statistical method used to summarize and analyze the interrelationships in time series economic data. The method is not based on explicit economic theories, so it provides an alternative to Structural Econometrics Models (SEMS).[1]

The VAR method is likely to discover historical relationships and interrelationships among economic time series. It is designed for forecasting and, in general, delivers estimators that have smaller mean squared errors. The method cannot be used, however, for evaluating the effects of changes in policies. The model of the economy which is assumed is a set of linear stochastic difference equations.

Stepwise regression models are used for exploratory analysis. The stepwise method is useful when there are many independent variables and, as a result, it is helpful to find out which of the variables should be incorporated into the regression model. The method gives an insight into the relationships between the independent variables and the dependent or response variable.

Both the VAR and the stepwise methods used data from two time periods. One, the full data set, runs from January 1950 (or the earliest month for which data is available but not later than January 1960) to June 1984. The second set, the truncated data set, has the same starting point but ends with the June 1974 data. For the VAR method another distinction was made, resulting in restricted and unrestricted models. The restricted model used only data from the Indiana economy. The unrestricted model used data from the national economy as well. This distinction gave four VAR models:

1. Restricted full;
2. Restricted truncated;
3. Unrestricted full; and
4. Unrestricted truncated.

Two stepwise models, the full and truncated, were used. For a detailed explanation of the models, see the **Technical Appendix.**

To see if the national variables had an effect on a current Indiana variable, an F test was used with the VAR models to compare the restricted and the unrestricted models for the full data set. Another F test was calculated for the truncated data set. In this way it is possible to observe whether the U.S. variables have become more or less important as predictors of the Indiana variables.

Stepwise regression sets were used to discover the changes that took place in the relationships between the Indiana and the U.S. economy. Consider the following two hypothetical cases. In a given sector, the current level of one Indiana variable depends only on its lagged values. In other words, only the Indiana data have a statistically significant effect on the variable. If the relationship is changed in such a way that, in more recent data, U.S. lagged values become more significant, we can infer that this sector of Indiana's economy is more integrated with the U.S. economy. On the other hand, it can also be shown that integration with the U.S. economy is decreasing for a given sector. If, in the truncated data set, U.S. lagged values dominate the stepwise regression while, in the full data set, Indiana lagged values become more important, we can conclude that the integration with the U.S. economy for the sector is decreasing.

The Data Source

The data base for this study was taken from the Economic Time Series data base maintained by the Indiana University School of Business. This extensive data base includes national as well as Indiana economic time series. All the data series are monthly employment figures in Indiana and the United States for the following sectors: manufacturing; durable manufacturing; agriculture; services; nondurable manufacturing; federal government; transportation; mining; furniture and fixtures; food and food products; lumber and wood; blast furnaces and steel work; electrical, gas, and sanitary services; printing and publishing; chemicals and allied products; rubber and miscellaneous plastics; stone, clay, and glass; fabricated metal products; machinery (except electrical machinery); electrical machinery; autos and auto parts; transportation equipment; instruments; and paper and paper products.

[1] See Christopher A. Sims, "Money, Income, and Causality," *American Economic Review,* September 1972: 540-52; Christopher A. Sims, "Policy Analysis with Econometric Models," *Brookings Paper on Economic Activity,* 1 (1982): 107-52; Thomas J. Sargent and Christopher A. Sims, "Business Cycle Modeling Without Pretending To Have Too Much A Priori Economic Theory," *New Methods in Business Cycle Research,* Federal Reserve Bank of Minneapolis, 1977: 45-109; Robert B. Litterman, "Techniques of Forecasting, Using Vector Autoregressions," *Research Department Working Paper 115,* Federal Reserve Bank of Minneapolis, 1979; and Yochanan Shachmurove, "The Integration of the Israeli Economy into the European Economic Community: Recent Trends and a Forecast," *The European Community and the State of Israel—Political and Institutional Aspects,* ed. Ilan Greifsammer, (Florence: European University Institute, 1984).

Results of the VAR Models

As is to be expected, U.S. variables have a significant predictive effect on their corresponding Indiana variables. Some exceptions are noted below.

One exception is that federal government employment in Indiana does not depend on federal government employment nationally in both the full and the truncated data sets. It seems that the trends in Indiana federal employment and the national federal employment are not related.

In the mining sector, the dependency of Indiana employment on the national employment appears to have increased when compared to its dependency a decade ago. Similarly, dependency on the national corresponding variable has increased in the following sectors: furniture and fixtures; lumber and wood; and printing and publishing.

In the food and food products sector U.S. regressors did not help predict Indiana employment a decade ago, nor do they today. It seems that this sector is less dependent on its national counterpart. The same is true of electrical, gas, and sanitary services. Because this particular sector serves only the local market, it is a reasonable exception. Another exception is the chemicals and allied products sector. One explanation for this deviation of employment in Indiana chemical industries, compared to national employment in chemical manufacturing, is the stability of Eli Lilly's pharmaceutical employment.

In the food and food products sector U.S. regressors did not help predict Indiana employment a decade ago, nor do they today. It seems that this sector is less dependent on its national counterpart.

Another exception to the dependence on national values is employment in instruments in the full data set. It appears that Indiana's employment in this industry a decade ago did depend on its national counterpart, but since then employment in this sector can be predicted on the basis of employment in Indiana alone. The reason may be traced to the fact that Indiana specializes in the manufacturing of medical and musical instruments; thus, employment in Indiana is protected from employment fluctuations in that sector nationwide. One additional sector that does not depend on its national counterpart is fabricated metal products. Because this sector depends on steel work, which is highly driven by its national counterpart, this exception seems puzzling.

Results of the Stepwise Models

We now turn to the sector by sector results of the stepwise regressions. For the manufacturing sector—both durable and nondurable—U.S. variables influence the current Indiana employment. Indiana is dependent on a few manufacturing industries for a relatively high and increasing portion of its economic activity. These sectors are growing slowly nationally and are highly sensitive to the national business cycle.

Indiana is dependent on a few manufacturing industries for a relatively high and increasing portion of its economic activity. These sectors are growing slowly nationally and are highly sensitive to the national business cycle.

The current employment in Indiana's agricultural sector is also affected by its corresponding national employment, with a lag of about a year or more. However, it seems from the data that a decade ago Indiana's employment in the agricultural sector was less dependent on the national level. This current dependency exposes the local economy to fluctuations in the national economy. One reason for the dependency may be that the number of employers whose only occupation is agriculture remained about the same in the last decade. In addition, agriculture is a declining sector in the national economy.

As for the service sector, it seems that Indiana is taking part in this nationally growing sector. Federal government employment in Indiana does not depend on federal government employment nationwide.

The transportation, mining, lumber and wood, and blast furnaces and steel sectors are affected by the current and lagged U.S. variable. In the furniture and fixture sector (in the full data set) and in the food and food product sector (in the truncated data set) current U.S. variables are not significant. Employment in the food and food product sector has increased its dependency on its national counterparts in the last decade.

The other industries which are to a large extent influenced by their national counterparts are rubber and miscellaneous plastics; stone, clay, and glass; machinery (except electrical machinery); autos and auto parts; transportation equipment; and paper and paper products. This heavy reliance on these industries, which are growing nationally at a slow rate relative to other sectors, exposed the Indiana economy to fluctuations in the national employment.

However, the corresponding national variables have less effect for electrical machinery, a national growth industry (in the full sample); fabricated metal products (especially in the full data set); electrical, gas and sanitary services; and chemical and allied products (in particular, in the full data set).

As expected, the current U.S. regressor displays a significant effect on Indiana employment in many sectors. Some exceptions are agriculture, printing and publishing, chemicals, and fabricated metal in both the full and truncated data set; furniture and fixtures in the full data set; and food and food products, electrical, gas, and sanitary services, and instruments in the truncated data set.

A previous study analyzed the interrelationships between Indiana employment and national employment by examining the differences in the full data series and a truncated series that ended in 1979.[2] The present article, which uses a similar method, truncated the data series five years earlier—that is, 1974. Two observations can be made in comparing the two studies. Some movements towards greater dependency on the national economy or movements towards greater independence observed in the prior study are corroborated in this one. These results reinforce this study's insights about long-term structural changes in the Indiana economy. The second observation is that for some industries the apparent trend suggested by the series truncated in 1974 is illusory. Instead of a trend towards greater dependence or independence for some sectors, there appears to be a cycle of either high dependence in 1974, followed by low dependence in 1979, followed by high dependence in 1984, or the exact opposite.

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[2] Yochanan Shachmurove, "A Time Series Analysis of the Relation Between the Indiana Economy and the U.S. Economy—Visions and Realities 1984," Indiana Academy of the Social Sciences, 1984.

One case where the two studies give noticeably different results is the service sector, which is shown as more dependent on its national counterpart ten years ago and today than it was five years ago. This result puts the previous finding in new perspective. It shows that, if the State of Indiana wants to reduce fluctuations in the amplitude of employment, it has to select and encourage those components within the service sector that are growing nationally—for example, finance, insurance, and computer services. Other sectors that have undergone a similar cycle from high to low to high dependency are the lumber and wood and the instruments sector. Cycles in the opposite direction of low to high to low dependency are found in the electrical, gas and sanitary services (in the stepwise model), and the printing and publishing sectors. These patterns are difficult to account for, and they are currently under investigation.

One important insight was found regarding the agricultural sector. Ten years ago it was much less dependent on U.S. employment than it was five years ago. The dependency was shown to continue to increase in the last five years. Because agricultural employment is declining nationally, this trend towards further and further dependency is alarming. Other insights can be found in some of the two-digit SIC sectors. The paper and paper products sector has followed a trend of becoming increasingly dependent on its nationally growing counterpart. However, the food and food products, the chemical and allied products, and the fabricated metal sectors have followed the trend of being less and less dependent on U.S. variables.

Conclusions and Some Policy Implications

The primary conclusion of this research is that, using VAR in conjunction with stepwise regressions, various patterns of development for different sectors of the Indiana economy can be seen.

This study demonstrates that time series analysis can be used to analyze major changes in the relationships between the national and the Indiana economy. It identifies sectors that are more isolated than others from the fluctuations in the national economy. These sectors, if encouraged by policymakers, can reduce the heavy dependency of the Indiana economy on the national economy. The State can attract these industries by offering tax incentives, providing the infrastructure, and gearing its investment in education and urban development towards these sectors.

The State also can identify and stimulate those sectors that are growth sectors at the national level. Services in general, printing and publishing, electrical machinery, and the instruments sectors are, in general, national growth industries.

Manufacturing in Indiana represented about 41% of the State's earned income in 1979. Total manufacturing, nationwide, generated 26% of the U.S.'s earned income in the same year. Indiana has become more dependent on the manufacturing sector. Industries in which Indiana specializes, such as primary metals and transportation equipment, are below the U.S. average growth rate in manufacturing in the last decade.

Employment in Indiana has been highly dependent on employment in manufacturing and, to a large extent, in metal-related industries, such as steel production, automobile parts, transportation equipment, household appliances, and fabricated metal products. These industries are highly sensitive to the national business cycles. Production in the metals industries tends to be done in large facilities. Indiana is competing with other states (and other countries) to attract and keep those facilities that already are here.

Indiana has become more dependent on the manufacturing sector. Industries in which Indiana specializes, such as primary metals and transportation equipment, are below the U.S. average growth rate in manufacturing in the last decade.

Indiana cannot and should not eliminate its concentration on durable manufacturing, which generates a large part of the State's earned income. Nevertheless, more diversification and a more balanced mixture of industries will better serve the State. Otherwise employment fluctuations are inevitable because demand for durable goods declines more rapidly during recessions and increases more rapidly during economic upturns. In addition, policymakers should be very sensitive to the competitiveness of these industries in national and international markets.

Indiana cannot and should not eliminate its concentration on durable manufacturing, which generates a large part of the State's earned income. Nevertheless, more diversification and a more balanced mixture of industries will better serve the State.

Much of the future of Indiana will depend upon the State's economic and educational abilities to compete with the rest of the world. The quality of the labor force is related to its educational qualifications. The lower percentage of Indiana's population with a college education indicates that it may be difficult for the State to attract firms that demand a highly educated work force. This is a serious problem, especially if the high-growth industries are expected to be those industries that employ highly educated employees. Indiana must be able to compete with highly educated people not only from New York, Chicago, and Los Angeles, but also from Tokyo, Geneva, Paris, and London.

> *The lower percentage of Indiana's population with a college education indicates that it may be difficult for the State to attract firms that demand a highly educated work force. This is a serious problem, especially if the high-growth industries are expected to be those industries that employ highly educated employees.*

It long has been recognized that both foreign languages and quantitative skills are economic commodities. This is especially true in Indiana, which ranks second among the 50 states in per capita income generated from exports. About one-third of Indiana's employment is affected by world trade, and 40% of Indiana's crops are sold to other countries. The State should identify sectors that are able to maintain stable employment, sectors that are growing nationally, and sectors with locational needs close to what Indiana has to offer.

This study analyzes employment in different sectors in Indiana a decade ago and today. Additional research should be done to ascertain what changes have taken place in the Indiana economy. Additional and more thorough exogeniety tests can pin down more mutual relationships between the national and the state economy. These extensions will improve our ability to formulate public policy and make it more flexible and adaptable to the changes occurring in the Indiana economy. ☐

Technical Appendix

The VAR Model

For each of the 24 sectors included in this study, VAR models were run in two categories: a restricted form and an unrestricted form. The restricted model used as regressors values of the same variable for the past 24 months. For example, employment in manufacturing in Indiana at time t is postulated to be dependent on 24 regressors of employment in Indiana manufacturing at time period (t-1), (t-2), . . . , (t-24). The unrestricted model includes, in addition to the Indiana data, the national data for the same sector of the economy for the same period. In other words, in addition to the 24 Indiana employment regressors, 25 additional regressors were added. In this example, the United States employment in manufacturing at time period t, time period (t-1), and so on back to time period (t-24) are added to the restricted model. The inclusion of the current U.S. value is a limited test of causality.[3] Causality tests are designed to check for the leads and lags relationships among variables. The aim is to see whether the current U.S. employment variable drives the Indiana employment variable.

The Stepwise Model

Stepwise uses the following selection strategies in choosing the variables to be included in the model.[4] Variables are added one by one to the model. The F statistic for a variable to be added has to be significant at the 0.15 level. When a variable is added, the stepwise method looks at all the variables already included in the model and deletes any variable that has an F statistic which is not significant at the 0.15 level. Only after these computations are compiled and the necessary deletions are accomplished can another variable be added to the model. The algorithm ends when no variables excluded from the model have an F statistic significant at the 0.15 level and every variable included in the model is significant at the 0.15 level, or when the variable to be added to the model is one that has been deleted from the model.

Explanation of the Table

The table on pages 12 and 13 displays both the stepwise and the VAR results. The dependent variables, employment in Indiana for the 24 sectors, are given in the first column. The headings *Indiana* and *USA* correspond to the lagged values of the dependent variable in the same row. The numbers 1 through 24 under the *Indiana* heading represent the first through the twenty-fourth monthly lag. Under the *USA* heading, the numbers 0 through 24 represent the current (lag zero) through the twenty-fourth lagged U.S. variables. For each dependent variable two rows are given. The first row presents the stepwise regression model using the full data set, from January 1950 (or the earliest available data) to June 1984. The second row gives the stepwise regression model using the truncated data set, from January 1950 (or the earliest available data) to June 1974. The column labeled R-squared presents, for the two data sets, the coefficient of determination for the stepwise regressions. The next column introduces the estimation results of the VAR model: the F tests for the VAR models, which test whether the current and U.S. lagged values have a significant effect on the current Indiana value. The row with the heading A corresponds to the full data set, and the row labelled B corresponds to the truncated data set.

The intersection of a row with a column headed by a number is marked by either a blank or an X. A coordinate with an X signifies that the coefficient of this cell was significant at the 0.15 F value in the corresponding stepwise regression.

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[3] See Christopher A. Sims, "Macroeconomics and Reality," *Econometrica*, 1980: 1-48; C.W. Granger, "Investigating Causal Relations by Econometric Models and Cross-Spectral Methods," *Econometrica*, 37 (July 1969): 424-38.

[4] See R. R. Hocking, "The Analysis and Selection of Variables in Linear Regression," *Biometrica*, 1976: 1-50.

Employment as an Indicator of Indiana's Dependence on the National Economy—Past and Present: An Examination of 24 Sectors as Summarized by Two Models

	Indiana																							
VARIABLES	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*
Printing and Publishing	x		x	x		x	x					x	x							x			x	
	x		x	x			x					x	x			x							x	
Chemicals and Allied Products	x					x		x			x	x	x	x						x				
	x	x	x		x			x			x	x	x											
Rubber and Misc. Plastics	x		x					x			x		x											
	x		x				x		x							x								
Stone, Clay and Glass	x	x		x				x		x					x								x	
	x	x	x		x					x					x									x
Fabricated Metal Products	x	x						x	x	x								x						x
		x						x		x						x		x						
Machinery Except Electrical	x	x		x		x																		
	x			x		x									x							x		
Electrical Machinery	x	x																						
	x	x							x															
Autos and Parts	x	x					x				x			x				x				x		
	x	x			x							x	x										x	
Transportation Equipment	x	x									x													
	x	x									x										x			
Instruments	x						x																	
	x							x																
Paper and Products	x	x																						
	x	x	x																			x		
Manufacturing	x	x					x			x		x	x	x		x		x						x
	x	x								x		x	x	x		x								x
Durable Manufacturing	x	x		x			x		x	x		x												
	x	x		x						x													x	
Nondurable Manufacturing	x		x				x				x	x	x									x		x
	x		x									x	x				x				x	x		x
Agriculture	x	x					x				x	x	x	x						x				x
	x	x									x	x	x	x										
Service	x	x	x							x	x	x	x					x					x	
	x											x	x											x
Federal Government	x	x																						
	x	x																						
Transportation		x					x	x		x					x	x				x				
						x	x	x				x				x						x	x	
Mining	x		x					x	x	x		x		x									x	
	x				x						x	x		x										
Furniture and Fixtures	x			x						x		x	x	x			x						x	
	x				x					x				x			x			x		x		
Food and Products	x						x			x			x		x							x		x
	x		x	x	x					x	x	x				x			x					x
Lumber and Wood	x	x										x	x	x										x
	x		x							x		x	x											x
Blast Furnaces and Steel Work	x	x						x	x						x	x	x							x
	x	x													x	x								
Electrical, Gas, and Sanitary Services	x							x	x	x				x						x				
	x	x									x	x		x									x	

												U.S.															
0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	R^2	*F Value*	*Model*
	x					x	x			x	x												x		.9978	2.11	A
			x				x		x					x									x		.9976	1.65	B
																			x					x	.9812	1.18	A
										x						x			x						.9727	1.17	B
x		x						x		x					x										.9883	5.03	A
x		x			x			x	x								x		x				x		.9873	4.03	B
x		x						x				x			x	x	x	x		x	x				.9446	4.48	A
x			x					x	x			x			x	x			x	x	x				.8282	2.10	B
	x																								.9842	1.32	A
	x											x											x		.9792	1.67	B
x		x		x			x								x	x				x			x	x	.9887	6.0	A
x	x			x		x	x				x			x		x	x	x					x	x	.9867	5.04	B
																									.9584	6.56	A
x	x							x		x		x	x				x						x		.9734	4.38	B
x	x												x											x	.9104	3.89	A
x	x	x														x	x							x	.8275	5.27	B
x	x							x				x		x	x	x	x		x						.9437	7.74	A
x	x							x				x		x		x	x								.9238	5.67	B
x	x		x			x					x								x			x	x		.9973	1.68	A
			x						x		x	x							x	x			x		.9949	2.87	B
x		x	x		x			x		x			x								x	x			.9904	3.11	A
x		x						x						x		x	x				x				.9923	2.67	B
x	x	x	x				x	x				x		x								x			.988	28.52	A
x	x	x		x			x	x			x				x									x	.988	22.10	B
x	x		x			x																			.988	35.33	A
x	x		x						x															x	.9875	26.82	B
x	x	x		x																	x	x			.963	9.46	A
x	x	x												x		x						x		x	.965	5.46	B
											x	x				x					x		x		.989	1.98	A
																									.982	1.47	B
x	x												x	x	x			x	x		x				.9997	6.68	A
x			x									x	x	x									x		.9994	3.35	B
																									.9856	.93	A
																									.9839	.83	B
x	x			x		x	x	x				x			x					x		x		x	.9902	7.28	A
x	x				x		x							x	x				x					x	.991	4.6	B
x	x	x		x	x			x	x					x									x		.9687	11.32	A
x		x						x	x							x				x	x				.9817	2.71	B
	x		x			x			x							x									.9586	2.6	A
x	x									x				x		x		x							.9636	2.18	B
x	x	x												x											.9803	1.93	A
	x																							x	.9863	1.72	B
x		x		x		x										x					x			x	.99	2.58	A
x		x														x				x	x			x	.9903	1.63	B
x	x	x							x						x	x	x							x	.9143	59.49	A
x	x	x													x	x									.8843	41.5	B
x																									.9839	1.34	A
		x																							.9882	1.75	B

Recession and Recovery Revisited

Morton J. Marcus

Morton J. Marcus is a research economist in the Division of Research, Indiana University School of Business.

Data revisions are the bane of economic analysts. Yesterday's bright observations and distinctive insights can be blown away in a tornado of revised data. For example, because of the latest revisions in personal income data provided by the Bureau of Economic Analysis in the U.S. Department of Commerce, Indiana's economy is now seen to have performed better during the economic expansion than previously was reported.

The data in **Table 1** indicates that what we had thought about the path of recovery in Indiana is now to be reconsidered. The big slowdown of spring 1984 has been revised away. Instead of a paltry .39% gain in the second quarter of 1984, we had a strong 2.45% gain. The data revision shows the third quarter half again as strong as previously reported.

Our Washington friends at BEA have revised all personal income series back to the first quarter of 1978. Major revisions were made in farm proprietors' income and in the residence adjustment applied to each state. These, plus other revisions for 1984 using more reliable data, provided a 3% increase in Indiana's total personal income for 1984:3. The entire nation was revised by only one-quarter of one percent. For Indiana, the third quarter 1984 revision was up by $1.95 billion; for the Great Lakes region, the revision was up by $11.2 billion (2.1%); for the whole nation, the revised figures were up by only $7.2 billion. Hence, economic analysts elsewhere now are wondering why their areas did not do so well as previously believed. In the Midwest, do we feel better off?

Table 1

Indiana Personal Income
(seasonally adjusted at annual rates)

Quarter	*Previously Reported*		*Revised*		*% Change*
	$ Billions	*Percent change*	*$ Billions*	*Percent change*	
1982:3	54.862		55.020		+ 0.29
1982:4	55.581	+ 1.31	55.777	+ 1.38	+ 0.35
1983:1	55.007	- 1.03	55.636	- 0.25	+ 1.18
1983:2	56.406	+ 2.54	56.900	+ 2.27	+ 0.88
1983:3	58.368	+ 3.48	58.801	+ 3.34	+ 0.74
1983:4	59.823	+ 2.49	60.330	+ 2.60	+ 0.85
1984:1	62.646	+ 4.72	62.680	+ 3.90	+ 0.05
1984:2	62.889	+ 0.39	64.215	+ 2.45	+ 2.11
1984:3	63.979	+ 1.73	65.928	+ 2.67	+ 3.05

Table 2

Personal Income in Billions of Current Dollars
(seasonally adjusted at annual rates)

	Share of U.S.			*% Change, 4th Quarter to 4th Quarter*		
	1978:4	*1982:4*	*1984:4*	*1978-82*	*1982-84*	*1978-84*
United States	100.00	100.00	100.00	44.94	17.37	70.12
New England	5.68	5.88	5.98	49.86	19.50	79.09
Mideast	20.08	19.89	19.73	43.57	16.39	67.09
Great Lakes	**19.59**	**17.59**	**17.53**	**30.18**	**16.98**	**52.28**
Plains	7.64	7.34	7.28	39.40	16.34	62.18
Southeast	19.75	20.45	20.67	50.07	18.64	78.05
Southwest	8.63	9.74	9.71	63.65	17.06	91.56
Rocky Mountains	2.72	2.87	2.82	52.94	15.07	75.99
Far West (incl. Alaska & Hawaii)	15.91	16.23	16.27	47.87	17.69	74.04
Illinois	5.76	5.29	5.26	32.93	16.69	55.11
INDIANA	2.40	2.12	2.16	28.33	19.52	53.39
Kentucky	1.33	1.31	1.29	42.03	16.15	64.97
Michigan	4.49	3.78	3.76	22.05	16.81	42.56
Ohio	4.88	4.43	4.41	31.57	16.92	53.82
Wisconsin	2.06	1.98	1.95	39.02	15.51	60.58

Percents may not add up to 100 because of rounding.

Regional Comparisons

With the guidance of the revised data, we can see that the recession from the fourth quarter of 1978 to the fourth quarter of 1982 hit hardest in the Great Lakes region. This five-state area declined from 19.6% of the nation's personal income to a 17.6% share. See **Table 2**. Within the Great Lakes, Michigan was hardest hit, falling from a 4.5% share of the nation to 3.8%. The national growth in personal income (not adjusted for inflation) was 44.9%, with Michigan posting only a 22% gain. Indiana was not much better at 28.3%. In the recovery period from the fourth quarter of 1982 to the same quarter in 1984, Indi-

> *The recession from the fourth quarter of 1978 to the fourth quarter of 1982 hit hardest in the Great Lakes region. This five-state area declined from 19.6% of the nation's personal income to a 17.6% share.*

ana's personal income grew faster than any other state in the Great Lakes region and faster than the nation as a whole. In the two years from the end of 1982 to the end of 1984, Indiana's personal income grew by 19.5%, compared with a 17.4% rate for the nation and 15.1% for the region.

> *In the recovery period from the fourth quarter of 1982 to the same quarter in 1984, Indiana's personal income grew faster than any other state in the Great Lakes region and faster than the nation as a whole.*

Table 3

Regional Shift in Personal Income
(measured in 1984:4, seasonally adjusted annual rates)

Region	*1978:4 to 1982:4*	*1982:4 to 1984:4*	*1978:4 to 1984:4*
New England	+ $ 5.9 bil	+ $ 3.3 bil	+ $ 9.2 bil
Mideast	- 5.8	- 5.2	- 11.0
Great Lakes	- 61.6	- 1.8	- 63.4
Plains	- 9.0	- 2.0	- 11.0
Southeast	+ 21.6	+ 6.8	+ 28.4
Southwest	+ 34.4	- 0.8	+ 33.6
Rocky Mountains	+ 4.6	- 1.7	+ 2.9
Far West (incl. Alaska & Hawaii)	+ 9.9	+ 1.4	+ 11.3

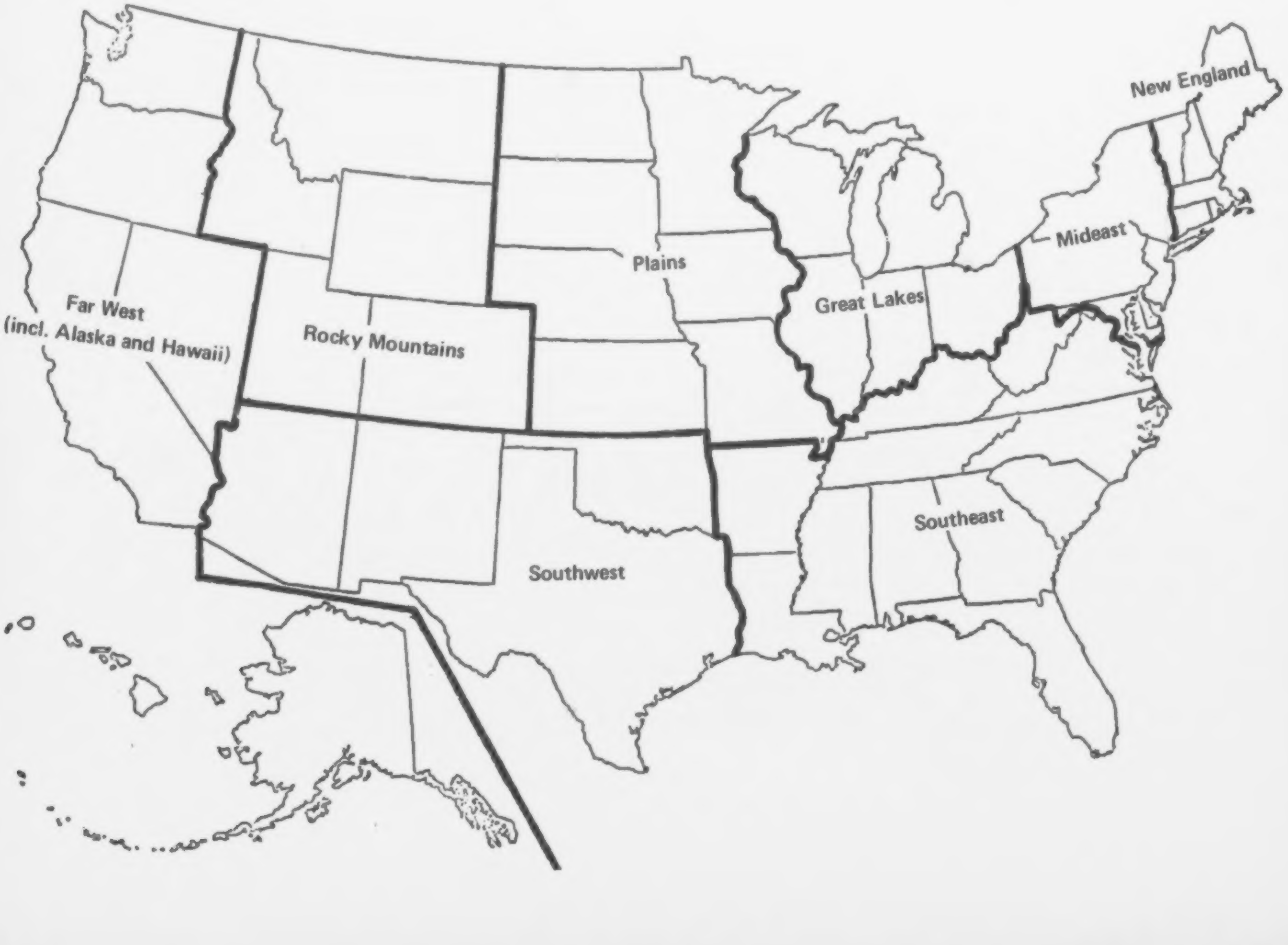
New England
Mideast
Plains
Great Lakes
Far West
(incl. Alaska and Hawaii)
Rocky Mountains
Southeast
Southwest

Table 4

Personal Income in Billions of Current Dollars
(seasonally adjusted annual rates)
Percent Change, Fourth Quarter to Fourth Quarter

	United States			*Indiana*		
	78-82	*82-84*	*78-84*	*78-82*	*82-84*	*78-84*
Total PI	44.94	17.37	70.12	28.33	19.52	53.39
Nonfarm PI	45.94	17.50	71.48	29.67	18.72	53.94
Farm PI	- 2.79	8.20	5.17	- 25.00	74.84	31.13
Total Earnings	33.95	18.38	58.56	14.54	20.09	37.55
Div/Int/Rent	80.02	23.94	123.12	70.13	26.60	115.40
U.I. Benefits	288.13	- 49.36	96.53	653.01	- 59.52	204.82
Other Transfers	65.35	10.06	81.99	69.12	10.27	86.49
Wages & Salary	36.69	16.32	58.99	16.59	16.68	36.03

Percent Change in Earnings by Industry, Fourth Quarter to Fourth Quarter

	United States			*Indiana*		
	78-82	*82-84*	*78-84*	*78-82*	*82-84*	*78-84*
Ag Serv/For/Fish	34.86	16.09	56.56	44.12	17.35	69.12
Mining	68.73	2.99	73.76	41.43	15.21	62.95
Construction	11.19	22.81	36.55	- 9.29	10.95	.65
Manufacturing	20.18	19.52	43.65	.79	24.57	25.56
Trans/Comm/PU	39.33	14.35	59.32	25.88	14.87	44.61
Wholesale Trade	36.73	18.07	61.44	18.50	18.66	40.61
Retail Trade	27.82	16.67	49.13	14.07	11.96	27.72
F.I.RE.	40.58	27.02	78.56	19.77	20.86	44.76
Services	59.18	23.32	96.29	51.30	20.81	82.79
Fed. Civilian	31.91	7.80	42.20	32.25	6.91	41.38
Fed. Military	57.07	11.21	74.68	84.92	19.74	121.43
State & Local	40.20	14.52	60.55	39.88	12.28	57.06

During the recession, it was the Mideast, the Great Lakes, and the Plains that lost most (as measured by shares of the nation's personal income). The economic expansion since the last quarter of 1982, however, has not reversed some of those trends. The Mideast, the Great Lakes, and the Plains have continued to lose in relative importance. They have been joined by the Southwest and Rocky Mountain regions. Only three regions have gained shares of personal income since the bottom of the recession: New England, the Southeast, and the Far West (including Alaska and Hawaii).

Measured in terms of personal income in the fourth quarter of 1984, the uneven path of the recession and the recovery has shifted more than $85 billion from the Mideast, the Great Lakes, and the Plains to other regions of the nation. See **Table 3.** For the Great Lakes, most of the shift came during the recession, but for the Mideast nearly half of the shift has occurred since the recovery began.

The data in Table 3 may be read as follows: If the Great Lakes region had performed at the national average for the past six years—that is, if it had been just mediocre—personal income in the region would have been $63.4 billion higher than it was at the end of 1984. Without this growth deficit, personal income in the five-state region would have been 11.7% higher than it turned out to be. New England's higher-than-average rate of growth meant that personal income was 5% higher because of the interregional shift.

Indiana's Recovery Performance

Table 4 indicates in which sectors Indiana has done better than the nation during the recovery. The Hoosier state was far ahead of the nation in the growth of farm income (75% compared with 8%). Dividends, interest, and rent grew faster in Indiana than in the nation (27% vs. 24%), and total earnings in manufacturing outpaced the nation by a 24.5 to 19.5% margin. At the same time, Indiana lagged behind the nation in the reputed growth industries of the 1980s: retail trade, finance/insurance/real estate, and services. Except for faster growth in the federal military, earnings growth in the Hoosier government sector lagged behind the nation.

Indiana's strong performance in the past two years, as indicated by these data, still leaves a growth deficit or an income shift that totals $7.3 billion. Total personal income in the State would be that much higher if Indiana had kept pace with the nation during the past six years. It can be hoped that continued superior performance will cut into that deficit as the economic expansion progresses. ☐

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IN THIS ISSUE

Every time we face a Business Outlook issue, participants are heard to grumble that they rarely have seen a time that was more difficult for economic forecasts. This midyear review is no different. To each of us this particular moment in history is on a ridge from which all we see are the clouds of the future. (Anagram aficionados will appreciate the fact that *cloud* and *could* contain the same letters.) Despite this lofty but obscured view, our brave outlook writers step forth once again with their midyear review of the business conditions in the nation, the state, and several key areas around the state.

MJM

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Midyear Economic Outlook: No Recession in 1985

R. Jeffery Green
Professor of Economics, Indiana University, Bloomington

The forecast presented in the November/December issue of the *IBR* anticipated that 1985 would be a year of solid if not spectacular growth and no recession but that "the risks to the forecast seem to be mostly on the downside." At midyear, however, we have seen six months of very slow growth. More and more questions are being raised about whether the recovery is ending and a recession beginning. Major imbalances in the economy signal danger, but overall it still appears more likely that the recovery will continue throughout 1985.

The **Table** shows the deceleration in economic growth in the U.S. early in 1985.

The U.S. economy has been growing at less than a long-run trend rate for the past year. The reasons are not hard to find. From the first quarter of 1984 to the first quarter of 1985, constant dollar domestic demand grew by 4.5% while constant dollar GNP grew by only 3.4%. The difference is the ever-widening trade deficit. Even though demand for more goods and services domestically was growing strongly, that demand was being satisfied by ever-increasing foreign imports.

Table

Percentage Change in Constant Dollar GNP 1984:1 - 1985:2 Billions of 1972 Dollars

Period	*GNP*	*% Change*
1984:1	1610.9	10.1
1984:2	1638.8	7.1
1984:3	1645.2	1.6
1984:4	1662.4	4.2
1985:1	1663.5	0.3
1985:2	1676.2	3.1 f

f = preliminary "flash" figure

The most important reason for our growing trade deficit is the strength of the dollar in international exchange markets. A high value of the dollar makes foreign goods relatively inexpensive here and our exports relatively expensive overseas. Primarily because of the weaker outlook for foreign trade and the disappointing performance in the first half of the year, our forecast for real GNP growth from the fourth quarter of 1984 to the fourth quarter of 1985 has been revised down from 4.1% to 2.2%.

> *Major imbalances in the economy signal danger, but overall it still appears more likely that the recovery will continue throughout 1985.*

Why is the dollar so strong? For several years the Federal Reserve has been following a policy of allowing only moderate growth in the money supply in order to reduce the likelihood of high inflation rates. These moderate money growth rates, when combined with unprecedented budget deficits, produced very high interest rates in the U.S. Many foreign investors acquired dollars in order to invest in the U.S. This demand for dollars raised the dollar exchange rate. Our November forecast anticipated a decline in the dollar as domestic interest rates fell in 1985. However, the dollar continued to rise until March, and so the trade balance continued to erode.

Since March the situation has improved somewhat and is the basis for our continued forecast of no recession in 1985. The Federal Reserve apparently has decided that a recession is more of a threat in the short term than is renewed inflation and so has raised significantly the rate of growth of the money supply. That has caused a sharp reduction in interest rates. By mid-June the treasury bill rate was down near 7%. The lower interest rates were, in turn, leading to a decline in the international value of the dollar which, with some delay, will allow the trade balance to improve.

Foreign competition does not affect all sectors of the economy equally. Most of the increases in foreign imports have been for durable consumer goods and for business equipment. With auto import quotas being removed, this flow of imported consumer goods is likely to expand further for a while. Eventually, if the dollar continues to decline, our domestic producers will become more competitive.

On the export side, our agricultural exports have been severely hurt. Given increases in world food supplies, our agricultural exports are not likely to return to previous peak levels even if the dollar does continue to decline.

Inexpensive foreign imports and sliding world oil prices have combined to produce a continuation of the moderate inflation of the past two years. In the 12 months ending in April, the Consumer Price Index increased only 3.7%. With the dollar beginning to decline, import prices should soon begin to rise. However, world oil production continues to outpace demand, and there remains significant downward pressure on prices. Consequently, our November forecast of inflation in the 4% range continues to look good. The weak growth in the economy in the first half of the year has caused the unemployment rate to stall near 7.3%. With growth resuming in the second half of the year, we expect the unemployment rate to reach 7% by year's end.

Much of our expectation of improvement in the economy depends on developments in foreign exchange markets and in foreign economies, both of which are extremely difficult to forecast.

Forecasts are always uncertain, but the magnitude of the uncertainties seems particularly great at this time. Much of our expectation of improvement in the economy depends on developments in foreign exchange markets and in foreign economies, both of which are extremely difficult to forecast. The continuation of low interest rates is dependent on the Federal Reserve continuing its easy money policy and perhaps on some improvement in the deficit situation. A recession coming from the deterioration of our international competitiveness cannot be ruled out, but it still seems most likely that the U.S. will avoid a recession in 1985. ☐

A Midyear Review of the Indiana Economy in 1985

Richard L. Pfister
Professor of Applied Urban Economics, Indiana University School of Business

Primarily because of slower growth of the national economy, the Indiana economy will grow less rapidly in 1985 than we forecast last November. Despite a slower growth rate, real personal income is now expected to be slightly higher at the end of 1985 than was forecast last November. This anomaly results from the upward revision of 1984 data by the Bureau of Economic Analysis, U.S. Department of Commerce, and a similar upward revision of 1984 employment by the Indiana Employment Security Division.

Here are the highlights of the midyear review of the Indiana economy:

- Growth in 1985 will be slower than forecast last November;
- Revisions of 1984 data on personal income and employment made growth even stronger in 1984 than previously reported;
- The revisions of 1984 data mean that 1985 takes off at a higher level than assumed last November, so that the updated forecast of real personal income for 1985:4 is slightly higher than previously forecast;
- Nonmanufacturing employment, despite the overall slowdown in 1985, will grow by 2.7% instead of the 2.5% forecast last November (fourth quarter to fourth quarter).

The **Table** compares last November's forecasts of key measures for the fourth quarter of 1985 with their June 1985 revisions. The data in the table do not suggest that the Indiana economy is slowing down, but the upward revisions of 1984 data have raised the takeoff level for 1985. Even though the growth rate will be slower in 1985, the year-end levels will not show it because we began 1985 at higher levels than assumed last November. Although the present forecast puts real personal income in the final quarter of 1985 slightly above last November's forecast, the rate of increase over 1984:4 is 2.1% for the update versus 4.4% for the November forecast.

The update places total establishment employment for 1985:4 68,000 higher than the November forecast. Yet the increase over 1984:4 is 2.0% in the update while it was 2.5% in November's forecast. Virtually all the upward revision in the employment forecast is the result of more growth in service industries.

Virtually all the upward revision in the employment forecast is the result of more growth in service industries.

Although the update forecasts greater employment in 1985:4, real wages and salaries are smaller (see the Table). There are at least two reasons for this decline. First,

Table

Indiana Forecasts for 1985:4
November 1984 Forecast Compared to June 1985 Forecast

Measure of Economic Activity	*Date of Forecast*	
	November 1984	*June 1985*
Real personal income (millions of 1972 $)	30,485	30,540
Real wages and salaries (millions of 1972 $)	17,792	17,683
Non-manufacturing employment (000's)	1,530	1,595
Manufacturing employment (000's)	619	622
Total establishment employment (000's)	2,149	2,217
Percent unemployed (seasonally adjusted)	7.5	7.8

1985:1 showed a drop in real wages and salaries because of a sharp decline in hours worked in February, apparently because of bad weather. Second, the overall average real wage declines as the lower-wage service industries account for a greater share of total employment.

The upward revison of the 1984 data means that growth in 1984 was even greater than the previously reported strong growth. Real personal income previously was reported to have grown by 7.2% from 1983 to 1984. The revised figures, however, show the increase to have been 8.6%. The revised total establishment employment increased in 1984 by 6.2% rather than the previously reported 2.7%. Whatever superlatives were used earlier to describe Indiana's 1984 growth now can be supplemented with some additional ones.

> *Whatever superlatives were used earlier to describe Indiana's 1984 growth now can be supplemented with some additional ones.*

Despite the strong recovery in 1984, establishment employment at the end of 1985 will not be back quite to the level of 1978:4. Nonmanufacturing employment at the end of 1985 will exceed its 1978:4 level by 115,000, but manufacturing (the high wage sector) will be 131,000 below the earlier peak. Indiana is not alone in this sluggish recovery of manufacturing employment. The nation as a whole has lost 1.7 million manufacturing jobs since 1979. Indiana has a greater share of its total employment in manufacturing (28% vs. 20% for the U.S.) and a lesser share of its manufacturing employment in the faster-growing industries.

> *Indiana has a greater share of its total employment in manufacturing (28% vs. 20% for the U.S.) and a lesser share of its manufacturing employment in the faster-growing industries.*

If our current forecast for the rest of 1985 holds up, the year will show the second greatest growth of real personal income (second to 1984) since 1978. The same holds for establishment employment. The disappointing aspect of the current recovery in Indiana is the relatively weak growth in manufacturing employment. We simply are not going to attain in the foreseeable future the 1978-79 peak employment in durable manufactures. □

Indianapolis

Robert Kirk

Professor of Economics, Indiana University-Purdue University at Indianapolis, with data assistance from Ron Martin, Indiana Employment Security Division

If momentum is a basis for a forecast, the Indianapolis economy should continue to expand. As **Table 1** shows, Indianapolis has had a very strong performance in employment during the recovery compared to the U.S., Indiana, and nearby states and urban areas. Before we get too exuberant, we should note that, for the states of Indiana, Michigan, Illinois, and Iowa, employment at the end of 1984 was still below the level achieved at the end of 1978. As the recovery matures, the rate of growth in employment during 1985 is expected to diminish to a 3-3.5% rate for Indianapolis. Most of the cyclical forces that contributed to employment growth in the initial phases of the recovery will have dissipated.

If we look at the employment change by major sectors (see **Table 2**), we get a better idea of Indianapolis's strengths and weaknesses as compared to its neighbors.

In terms of employment, the recovery in autos (+ 4,226) was largely offset by the decline in electrical machinery (− 3,811), due principally to the phaseout of Western Electric. Cyclical factors caused increases in primary metals, fabricated metals, and nonelectrical machinery. Decreases in employment occurred in instruments, a sector that has been given special attention in development strategies for the city. Nondurables made no contribution to the employment recovery, primarily because 1,000 jobs in the food industry were lost through plant closings and an acquisition.

> *As the recovery matures, the rate of growth in employment during 1985 is expected to diminish to a 3-3.5% rate for Indianapolis. Most of the cyclical forces that contributed to employment growth in the initial phases of the recovery will have dissipated.*

The nonmanufacturing sector contributed 39,000 of the 45,500 jobs gained during the recovery. The primary contributors were (1) such cyclical industries as construction (4,900) and trucking (2,000), and (2) industries serving the local community, such as retailing (8,900), services (13,700), and state and local government (2,300).

Table 1

Employment Change During the Recovery Period (12/82-12/84) (in percent)

Area		*Area*	
U.S.	7.9	Wisconsin	7.4
Indianapolis	**9.0**	**Indiana**	**8.2**
Cincinnati	6.6	Michigan	7.7
Columbus	8.7	Illinois	2.6
St. Louis	7.6	Iowa	3.3

A Forecast

A forecaster has to make some assumptions. As an expansion matures, frequently there is upward pressure on prices—as productive capacity is strained—and on interest rates—as credit demands increase. Then the Federal Reserve frequently shifts to a tighter monetary policy to restrain the inflationary pressures, the result being a slowdown in the rate of growth or a recession. At present those forces that would call for a monetary tightening are not apparent,

Table 2

Employment Growth during the Recovery (12/82-12/84) by Major Sector for Selected Metropolitan Areas (in percent change)

Metropolitan area	*Total*	*Mfg.*	*Durables*	*Autos*	*Nonmfg.*	*Retail*	*Fin. Insur., & Real Estate*	*Constr.*	*Services*	*Services as % of total*
Indianapolis	9.0	6.0	9.3	48.3	9.9	9.2	3.9	25.9	15.7	20.6
Cincinnati	6.6	3.3	7.2	30.4	7.7	7.7	9.6	15.0	12.4	23.0
Columbus	8.7	9.7	14.4	—	8.5	11.6	8.1	30.5	9.9	21.7
St. Louis	7.6	8.6	13.4	101.0	7.4	10.5	5.4	12.1	8.5	23.1

and the Federal Reserve is expected to provide an accommodative environment to sustain the recovery.

For Indianapolis, the final phaseout of Western Electric means that its employment loss no longer will offset employment gains in other durables industries. However, the cyclical factors that promoted employment growth in the durables are not expected to be a major continuing source of employment gain during the forecast period.

The automobile industry, for example, faces some issues that may affect the ability of local auto parts producers to maintain their employment base. Domestic auto producers face an increased supply of smaller cars. More Japanese automakers are manufacturing in the U.S. There are more foreign imports, including some new names—Hyundai from Korea and Yugo from—you guessed it—Yugoslavia. U.S. car makers need to sell small cars to meet CAFE standards. Although the full impact of these forces will occur over a time span longer than the forecast period, increased uncertainty over domestic production levels will be felt during the next six months.

In the nonmanufacturing sector, several commercial projects are planned that should maintain construction employment but not be a major source of employment growth. The primary sources of employment growth during the recovery were retailing and services. Many of these activities are derived from locally-generated demand. This demand is based on factors such as population and income growth.

Table 3 shows how estimates of Indianapolis's population growth compared with surrounding metropolitan areas and the U.S. For Indianapolis and Columbus, estimates are in a category by themselves. When compared to the U.S., on the other hand, Indianapolis and Columbus show that they are part of the Midwest, where population growth is slower than in the rest of the nation.

Table 3

Estimates of Population Change, 1980-84, for Indianapolis, Surrounding Metropolitan Areas, and Resident U.S.

Metropolitan area	*% change*
Indianapolis	2.4
Columbus, Ohio	2.8
Cincinnati	0.5
St. Louis	0.9
Detroit	−3.9
Chicago	1.1
Louisville	0.5
U.S.	4.2

Support for locally-provided services also depends on income growth. Some analysts have asked, "Is the middle class shrinking?" Factors to support this hypothesis include the decline of employment in smokestack industries, rapid growth of high-tech industries (which, according to some analysts, have bipolar occupational and income structures), and the shifting industrial structure from goods-producing to service industries. However, there is no evidence nationally that the middle class is shrinking (see *Monthly Labor Review*, March 1985).

Growth in Services

Table 2 showed Indianapolis with the highest rate of increase in services for the metropolitan areas in the comparison. Does Indianapolis have a comparative advantage in services? Table 2 indicates that, even with the strong rate of increase, services as a percentage of total employment is less in Indianapolis than in the other areas. Further analysis is required to determine if the city played "catch-up" during the recovery or has some distinctive advantages.

The service sector is very diverse. Measures of growth of important components of the service sector are shown in **Table 4.**

The percent changes exceed the total metropolitan employment change of 9%. Because of the efforts to control health care costs, the percent increase in health services is not expected to be above average. The rise in business services (including personnel supply, data processing, management, consulting, and public relations), accounting, and social service components represents a source of demand for office space.

Table 4

Components of Services Sector in Indianapolis, Absolute Change and % Change in Employment During the Recovery, 12/82-12/84

Component	*Absolute Change*	*% Change*
Hotel and Motel	941	20.1
Business Services	5,981	38.5
Auto repair	932	27.3
Health Services	2,806	9.3
Accounting, architectural and engineering	834	19.7
Social services	1,221	21.0

Firms are hiring part-timers rather than incur the costs of full-time employment in an uncertain market. Thus, although the business services component shows a big absolute and percentage change, some of this growth reflects the increased reliance upon part-time help and has serious implications for household income.

Nationally, during the recent recovery one out of 13 new jobs has been in the personnel supply services industry. Further analysis indicates that almost all of this industry's growth has been in the temporary help area. Firms are hiring part-timers rather than incur the costs of full-time employment in an uncertain market. Thus, although the business services component shows a big absolute and percentage change, some of this growth reflects the increased reliance upon part-time help and has serious implications for household income. The addition of one part-time worker does not offset the loss of a Western Electric worker in terms of household income and Indianapolis metropolitan income. ☐

South Bend-Elkhart

John E. Peck

Professor of Economics, Indiana University at South Bend

Economic conditions in both the South Bend and Elkhart communities have been relatively stable in recent months. Following the overall lead of the national economy, both areas have fully recovered—at least in terms of total employment—from the prolonged recession of the late 1970s and early 1980s. Elkhart in particular recorded significant gains throughout 1984. A recent slowing of activity is believed to reflect conditions in national markets, not a signal of impending recession.

The **Table** summarizes various indicators of local economic activity for the South Bend and Elkhart communities as tracked by Indiana University at South Bend's Bureau of Business and Economic Research. The figures contained in the table are seasonally adjusted and, with the exception of the unemployment rates and real estate data, are index numbers expressed as a percentage of 1967 base year values. In each table, comparative index numbers are given for January and February 1985. Index numbers are also given for a February 1985 to February 1984 comparison.

South Bend

It will be noted from the Table that on the February 1985 to February 1984 comparison nearly all indicators recorded advances. Exceptions were in the volatile housing and real estate area, where activity remains somewhat sluggish. The most recent employment data suggest that, while prerecession levels have been regained as a whole, gains in nonmanufacturing employment were needed to offset a continuing weakness in manufacturing employment. The persistent loss of manufacturing jobs in the South Bend area remains a problem.

Both negative and positive factors will affect the South Bend area in coming months. On the negative side are the continuing phased shutdown at Bendix Automotive and questions relating to AM General's success or failure in obtaining additional government truck business. On the positive side, there are significant accomplishments in the area of economic development, including (1) Scott Brass's acquisition of a portion of the Dodge facility in Mishawaka; (2) Montgomery Ward's telemarketing expansion; and (3) the completion of Clark Communication's move to the area. Overall, the remainder of 1985 should be flat, reflecting these offsetting local developments and a relatively moderate rate of growth in the national economy. On balance, South Bend employment should increase in the months ahead, but only by a percentage point or two.

The remainder of 1985 should be flat, reflecting offsetting local developments and a relatively moderate rate of growth in the national economy.

Elkhart

The Table suggests that Elkhart's performance from February 1984 to February 1985 was similar to South Bend's. Most indicators showed gains. Recent declines in employment locally reflect a softening in national markets, particularly in the RV and mobile home industries that are so important to Elkhart's economic health. RV shipments, for example, were down some 8% nationally for the first three months of 1985 over the comparable 1984 period.

The Elkhart outlook for the remainder of 1985 is favorable. Continued moderation of interest rates should favorably affect Elkhart's interest rate-sensitive industries. Further, a recent Manpower, Inc., survey found a 50% response for increased hiring with only a 3% response for reduction. Given the absence of severe negative factors, local employment once again should rebound to show a yearly growth rate of about 4%. ☐

Selected Economic Indicators for South Bend and Elkhart
(Seasonally Adjusted Indexes: 1967 = 100)

	South Bend					*Elkhart*				
				% Change from					*% Change from*	
Employment Data	*February 1985*	*January 1985*	*February 1984*	*January 1985*	*February 1984*	*February 1985*	*January 1985*	*February 1984*	*January 1985*	*February 1984*
Establishment Employment										
Nonagricultural Employment	118.4	118.5	112.8	−.1%	5.0%	171.5	171.8	164.9	− .2%	4.0%
Manufacturing Employment	81.5	80.7	77.5	1.0%	5.2%	158.7	159.1	155.8	− .3%	1.9%
Nonmanufacturing Employment	139.4	140.2	133.0	−.6%	4.8%	305.7	307.0	285.8	− .4%	7.0%
Unemployment Rate	8.6	7.5	8.1	n/app	n/app	7.3	8.8	6.6	n/app	n/app
Help Wanted Advertising	103.0	101.3	100.9	1.7%	2.1%	-	-	-	-	-
Utilities										
Industrial Electricity Sales	152.9	152.8	133.6	.1%	14.4%	194.4	189.0	180.4	2.9%	7.8%
Commercial Gas Sales	155.3	129.0	141.7	20.4%	9.6%	116.3	146.3	162.8	−20.5%	−28.6%
Industrial Gas Sales	95.5	78.0	92.1	22.4%	3.7%	321.5	255.3	292.1	25.9%	10.1%
Retail Car & Truck Sales										
New Passenger Car Sales	116.2	116.7	97.4	− .4%	19.3%	-	-	-	-	-
New Truck Sales	230.1	282.3	212.6	−18.5%	8.2%	-	-	-	-	-
Housing Construction Data #										
Estimated Value of Permits	199.2	268.3	198.3	−25.8%	.5%	182.8	234.3	244.0	−22.0%	−25.1%
Number of Permits Issued	52.3	37.2	56.4	40.6%	−7.3%	86.1	45.8	106.1	88.0%	−18.9%
Average Value Per Permit	392.2	351.4	358.3	11.6%	9.5%	262.3	552.3	278.1	−52.5%	− 5.7%
Residential Real Estate Data ##										
Number of Active Listings	1268	1267	1203	.1%	5.4%	1074	1061	1173	1.2%	−8.4%
Closed Sales										
Average Days Listed	75	63	83	19.0%	− 9.6%	112	107	119	4.7%	−5.9%
Average Market Price	$43,228	$47,300	$49,363	− 8.6%	−12.4%	$44,905	$46,185	$44,341	−2.8%	1.3%
% of Sale to List Price	92.8	93.8	91.7	− 1.1%	1.2%	94.5	95.0	93.8	− .5%	.7%

# All Elkhart construction data has a base year of 1970.
## Real estate data are not index numbers but are unadjusted weekly averages.
Sources and definitions of data are available on request.

Fort Wayne

Thomas L. Guthrie

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The original 1985 forecast (*IBR*, Nov-Dec 1984) for the Fort Wayne area—a 2-3% gain in employment—appears intact at midyear. Through April, nonagricultural payroll employment increased almost 1%, or 1,400, from a seasonally adjusted level of 160,200 last December.*

Since the original 1985 forecast, revised employment data for the Fort Wayne area for 1983 and 1984 have been released. The revised data are noteworthy for two reasons. First,the employment gain for 1984 (December to December) was greater, 9,000 versus an initially reported gain of 7,900 from the preliminary data. The relative gain was 6%.

Second, the revised data reveal a significantly different—and more plausible—pattern of employment expansion in 1984. The revised data show the employment gain concentrated in the first half of the year. Employment actually declined marginally in the second half. The preliminary data had traced a relatively straight-line expansion path.

The revised employment data for 1984 are more consistent with the fundamental forces that shaped the original 1985 forecast. That is, 1985 was envisioned as a struggle between the positive impact of successful local economic development efforts and the negative impact locally of national economic policy. The marginal decline in area employment in the second half of 1984 is proof of the strong influence of the national economy on the area economy. Manufacturing employment declined nationally last fall because of the twin burdens of high real (inflation adjusted) interest rates and the high value of the dollar in foreign exchange. The negative impact on the area economy was magnified by this region's disproportionate reliance on manufacturing activities. Because both burdens continue unabated, with no immediate relief in sight, the negative impact on the area economy, especially the older, less efficient manufacturing facilities, will continue throughout 1985.

Conversely, the positive results from area economic development efforts continue to become more visible every day throughout northeastern Indiana. The 2.1 million-square-foot GM facility is the flagship of the new fleet being constructed. However, the first major impact of GM employment doesn't appear likely until at least the first half of 1986.

The original 1985 area economic forecast noted that national economic policy puts the forecast at "substantial risk." Interim results strengthen the caveat.

The 1985 forecast remains the same—that local economic development will prevail—but the data to date suggest a standoff. Area employment has been essentially unchanged since last July. The 1% gain since January just offsets the marginal decline that occurred during the last half of 1984. The original 1985 area economic forecast noted that national economic policy puts the forecast at "substantial risk." Interim results strengthen the caveat. ☐

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*Employment levels reported are not consistent with previous reports. The U.S. Department of Commerce, based on results from the 1980 census, has changed the counties that make up the Fort Wayne Metropolitan Statistical Area (MSA). The new MSA consists of Allen, DeKalb, and Whitley Counties. The old MSA excluded Whitley County but included Adams and Wells. Beginning in 1985, employment data were adjusted to the new definition.

Terre Haute

Marvin Fischbaum

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The Terre Haute economy apparently softened in the last quarter of 1984, and weakness persisted through the first quarter of 1985. Conditions may well improve in the second half of 1985, but any improvement will fall far short of returning the region to anything that could be characterized as prosperity.

Conditions may well improve in the second half of 1985, but any improvement will fall far short of returning the region to anything that could be characterized as prosperity.

Complicating the assessment of local conditions is the changeover by the Indiana Employment Security Division in the definition of the local metropolitan area. Effective January 1985, the Division reports data on the Metropolitan Statistical Area (MSA) of Vigo and Clay Counties, as defined in the 1980 Population Census, rather than on the old four-county Standard Metropolitan Statistical Area (SMSA), which also included Sullivan and Vermillion Counties.

In early 1984 the revised and seasonally adjusted unemployment rate for the new two-county MSA improved rapidly from 10.3% in January to 8.6% in July. October was the best month, with a seasonally adjusted rate of 8.2%, but by March 1985 unemployment had increased to 9.8%. 1984 establishment employment data for the MSA are not available, so that meaningful employment comparisons over the six-month period simply cannot be made. Moreover, it is impossible to identify the source, and so the significance, of the increase in unemployment. Flat retail sales, however, confirm that the economy is soft.

For purposes of understanding the local economy, the change in metropolitan area definition is unfortunate. A broader rather than a narrower definition of the region would be useful. With the decline in manufacturing activity over the past six years, economic activity in Vigo County depends more than ever on the economic health of the surrounding counties. Wholesale and retail sales, health care, higher education, broadcasting, publishing, financial, and other services are provided to the Wabash Valley, which encompasses west central Indiana and east central Illinois.

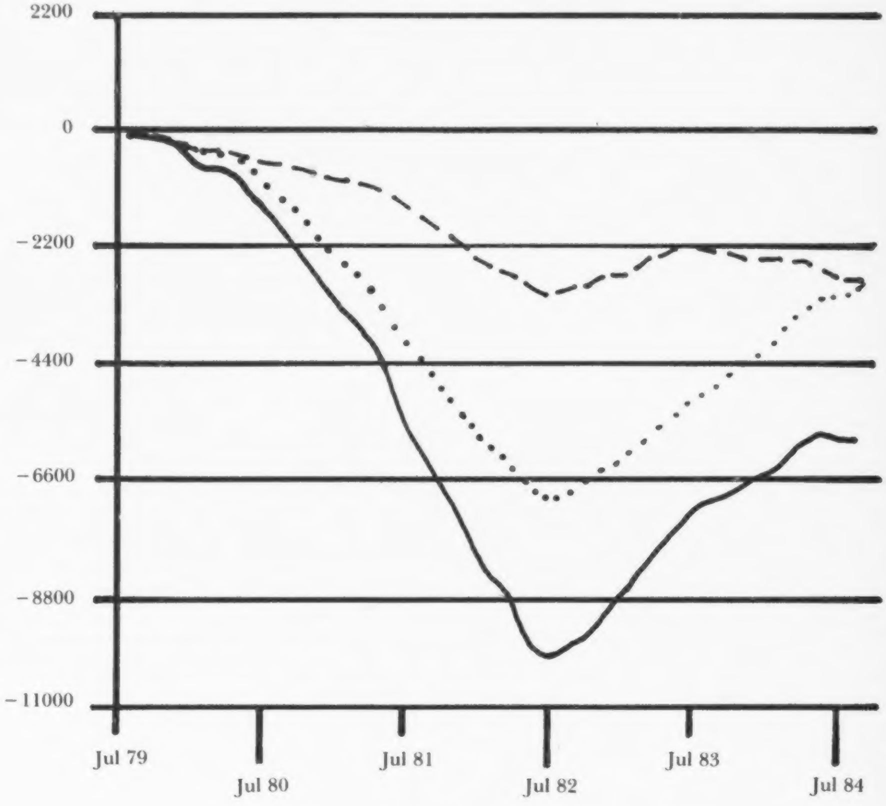
New construction activity underlines this dependence on regionally-provided services. Spring saw the start of construction on the largest new structures for quite some time: a new building for Ivy Tech and a two-story addition to the clinic of the Associated Physicians and Surgeons. Rose-Hulman Institute of Technology announced an $11 million modernization of its main classroom building, and Indiana State University received authorization to build a new physical education building. All this activity, together with some revamping and construction of retail space, work on a new home for Patterson Equipment, and the delayed start of construction on Sony's video disc facility, should move area nonresidential construction out of the doldrums.

With the decline in manufacturing activity over the past six years, economic activity in Vigo County depends more than ever on the economic health of the surrounding counties.

Residential construction activity may be moving in the opposite direction. After strong increases in 1982 and 1983, a cyclical peak may have been reached in early 1984. A modest and irregular decline then set in. Much of the construction in 1985 has been in apartments. Given the state of the resale market, with a huge stock of houses for sale, and softening prices, the relatively high level of new home construction has been a mystery. With the decline in mortgage interest rates, there has been some pickup in the real estate activity, some reduction in the

Table 1

Changes in Employment
Vigo, Clay, Sullivan, and Vermillion Counties
July 1979-July 1984

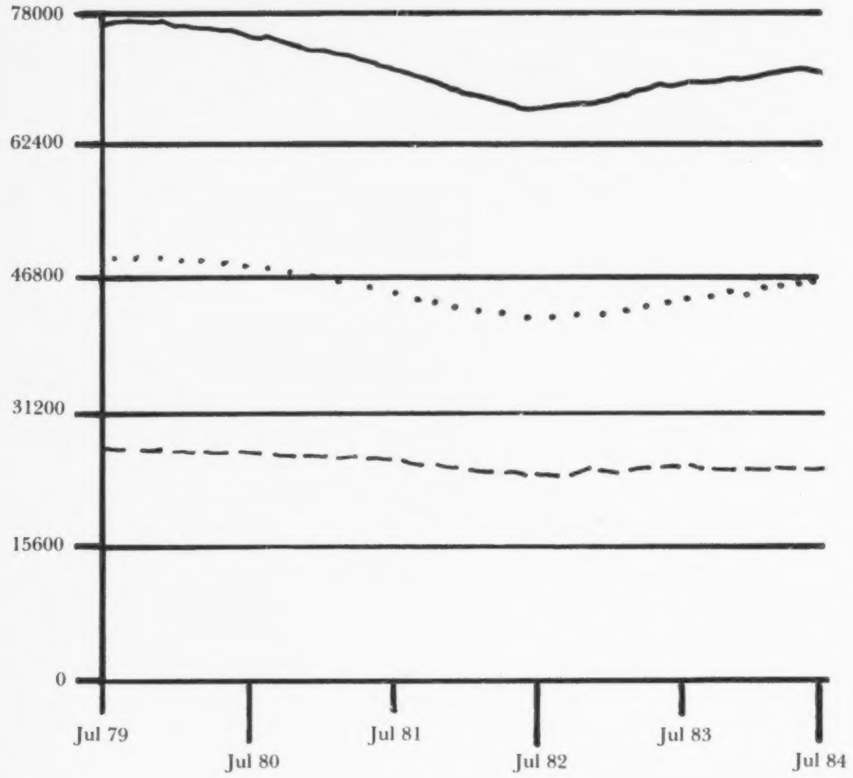


13-month moving average
Source: INDIRS

SMSA ————
Vigo . . . .
Remainder — — — —

Table 2

Employment Level
Vigo, Clay, Sullivan, and Vermillion Counties
July 1979-July 1984



13-month moving average
Source: INDIRS

SMSA ————
Vigo . . . .
Remainder — — — —

time a house remains on the market, and perhaps some firming in price, but the number of houses available for sale remains at or near record levels.

Agriculture, in the midst of the most serious and protracted depression since the 1930s, may be one key to the current softness in the local economy. Land prices measure (economists would say *capitalize*) expected long-term profitability. Since 1980 area prices for prime farm land have fallen about 50%; prices for land less good but still tillable experienced an even steeper decline. With bumper crops in prospect and no help from Washington forthcoming, the end of the agricultural depression is not in sight.

> *With bumper crops in prospect and no help from Washington forthcoming, the end of the agricultural depression is not in sight.*

Business conditions, generally, should improve in the last half of 1985. In addition to increased nonresidential construction activity, Tri Industries plans to increase employment, the Digital Audio Disc Corporation plans to triple production by year's end, and the FAA weather station will begin to be phased in. The local economy also should benefit from the expansionary tilt in recent Federal Reserve policy.

To put matters in perspective, both the slowdown in activity over the past nine months and the expected pickup in the second half of 1985 are minor ripples compared to blows suffered from 1980 through July 1982 and to the recovery that began to stall about a year ago. **Tables 1** and **2** trace employment levels in the four-county SMSA, in Vigo, and in the other three counties taken as a group. They show that through July 1984 Vigo County had recouped close to 60% of the jobs lost in the recession. They also show that Vigo and the outlying counties traced very similar patterns through July 1983, but the outlying counties then lost most of their gains. For the SMSA employment gains have been in trade and services, and manufacturing employment has not come back. ☐

Anderson-Muncie

Robert R. Jost

Professor of Economics, Ball State University

By far the most important economic news in the Anderson-Muncie metropolitan areas is General Motors' decision to build a new $70 million, 160,000-square-foot Magnequench plant in Anderson. This is welcome news for Anderson, given the past migration of plants southward and the current razing of obsolete plants in Anderson.

Magnequench is the result of a dramatic technological breakthrough in manufacturing high performance magnets, using a process discovered by three GM scientists in 1978. This discovery revolves around the rapid solidifying of an alloy of three metals—neodymium, iron, and boron—from liquid to solid state by cooling (quenching). This process produces magnets that are lighter and far more powerful than magnets made in traditional ways. The first major production application will be a permanent magnet gear reduction cranking motor, which is scheduled for introduction in the 1986 model year. However, the same process can be applied to many kinds of motors, from those used in small home appliances to those used in heavy construction equipment. The potential spinoff from this high-technology breakthrough is incalculable at this time. What is clear is that GM intends to be a market leader in high-tech magnet manufacturing.

The Anderson acquisition of the Magnequench plant was a consequence of a new spirit of cooperation between Delco labor, management, and government. Eighty-one percent of the UAW workers approved contract changes geared to increase productivity. Some $3.5 million in state, local, and federal funds are being channelled into site improvement for the plant.

There is more good news for the city Rand McNally defamed as the tenth worst metropolitan area in the nation in which to live. Kohl's department chain has made the decision to erect a new 64,500-square-foot store near the Indiana 109 bypass. This move is expected to add 300 employees to Anderson's work force.

The good news for Anderson must be weighed against the impact of President Reagan's decision not to renew the "voluntary" import quotas on Japanese motor vehicles. It is estimated that Japanese-produced auto imports will increase from 1.8 to 2.3 million units this year. In the short run this will significantly reduce the demand for domestically-produced motor vehicles and, accordingly, the derived demand for General Motors auto components produced in Anderson. The long-run consequences are somewhat more obscure. They depend heavily on even greater cooperation between labor and management and on GM's ability to innovate technologically in order to reduce Japan's productivity advantage in auto manufacture.

The first available 1985 monthly data for the Muncie Business Index (MBI) held steady at the same level as December 1984. Both the finance and manufacturing sectors registered gains, but these were offset by declines in the trade and government sectors. When employment data for the balance of the first half of 1985 become available, they should register modest above-seasonal gains in construction and retailing—the latter reflecting several new establishments opening in the near future.

Overall the *average* reading for 1984 was 3.4% higher than the average for 1983 (see **Table 1**). This welcome increase should not obscure the harsh reality that the 1984 MBI average was 9.4% below 1978's 126. The long and the short of it is that the trend in the Muncie economy since 1979 has generally been downward, with the bottoming in 1982 followed by a less than exuberant recovery (see **Figure 1**).

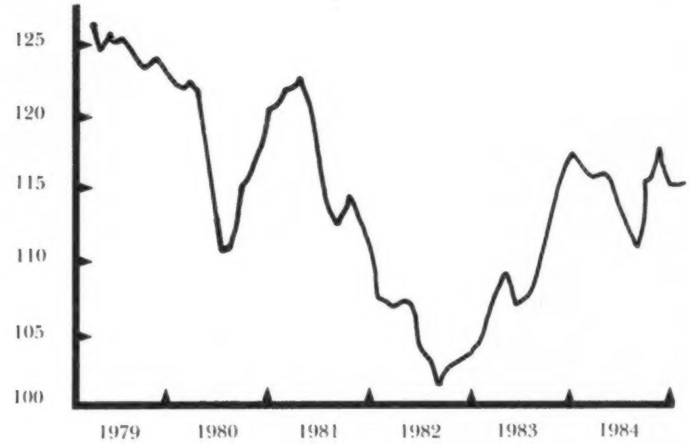
Breaking the index down into its component sectors, manufacturing (which carries a 40% weight) declined a whopping 25% in the 1979-82 period. The trade and service sector (25% weight) and the finance and real estate sector (15% weight) declined 8.7% and 29% respectively during the same period. The government sector, which is simply a measure of government employment, was the only sector that didn't bottom in 1982, but continued a slight downward trend into 1984.

While the index is intended to give a broad measure of economic activity in the Muncie area, it is by no means comprehensive. Like other indexes, it uses a systematic measure of certain weighted variables over time. A comparison between average annual establishment employment data for Muncie (see **Table 2**) with the MBI averages may provide further insight into Muncie's economic travail. Observe that average establishment employment followed a path similar to the MBI, with employment in the important manufacturing sector bottoming in 1982 at 10,400 workers—a precipitous 30% decline from its 1979 level. Despite two years of recovery, most of the lost ground in manufacturing has *not* been made up; the 1984 average is only 8.7% above its 1982 low. On the other hand, employment data for the trade and service sector does

Table 1
Muncie Business Index Annual Averages

	1979	*1980*	*1981*	*1982*	*1983*	*1984*
Muncie Business Index Average	**124.1**	**117.0**	**115.6**	**104.2**	**110.5**	**114.2**
Manufacturing	103.7	93.4	89.3	78.2	83.0	90.0
Trade and Service	133.6	130.0	127.6	119.6	128.0	122.0
Government	160.5	159.0	159.1	154.6	150.5	148.0
Finance and Real Estate	114.4	98.5	108.2	80.0	95.0	99.3

Figure 1
Muncie Business Index



1967 = 100; three-month moving average
Seasonal and inflationary effects removed

Table 2
Muncie Establishment Employment—Annual Averages

	1979	*1980*	*1981*	*1982*	*1983*	*1984*
Av. Annual Estab. Empl.	**50.9**	**49.4**	**48.4**	**45.4**	**44.9**	**46.4**
Manufacturing	14.8	13.3	12.5	10.4	10.6	11.3
Trade and Service	19.7	20.1	20.3	20.0	19.5	20.0
Government	10.7	10.7	10.5	10.4	10.2	10.2
Finance and Real Estate	1.6	1.6	1.6	1.5	1.5	1.5

not parallel the decline in the MBI index. Indeed, average establishment employment in the trade and service sector has remained essentially flat for the 1979-84 period. Unfortunately, the lumping together of trade with the less cyclically sensitive service sector in the index masks the growth of the latter and probably accounts for much of the divergence. Additionally, some of the large retail stores that formerly provided data for the MBI no longer do so, obstensibly for competitive reasons; consequently, the index may now underestimate changes in this sector.

Recently released Census Bureau population data corroborate Muncie's traumatic economic decline. Thus, between April 1, 1980, and July 1, 1983, the population of the Muncie metropolitan statistical area (Delaware County) declined 2.4%, while the state of Indiana declined only .2%. Of course, 1984 census data are not available, but employment data and grade school enrollment numbers suggest a decrease in the rate of decline, if not its arrestment.

The outlook for both the local and the national economy for the second half of 1985 is cloudy, to say the least. Economists agree that the nation's economy has slowed dramatically since the exuberant 8.6% annual rate of increase that characterized the first half of 1984. Indeed, the second half of 1984 witnessed a mere 2.7% rate of increase, followed by an anemic .7% real growth for the first quarter of 1985. Almost all economists agree that the second quarter of 1985 also will reveal minuscule growth. However, sharp disagreement exists among the forecasting fraternity as to the path the nation's economy will follow in the second half of 1985. This analyst believes, for whatever it may be worth, that the nation's economy will improve during the second half of the year, based on the lagged impact of the rapid growth of money and credit and the decline in interest rates. Of course, the linkage between the national and local economies is complex and far from clear to even the careful observer, but there can be little doubt that a more robust national economy generally bodes well for many local business firms.

The long-run future trend of the Muncie economy remains an unknown, but there are some pluses that warrant at least a modicum of optimism. The Muncie area is well situated to service the surrounding region by exporting retailing, university, and hospital services. If some portion of the new gasoline tax is allocated to improve the highway infrastructure, Muncie's geographic location will be better exploited. Local employment is concentrated in small business enterprises with the capacity to innovate and spin off new businesses. Both management and labor are beginning to recognize that cooperation rather than confrontation may be necessary to survive in competitive world markets. The instituting of "prime-time" programs in the public schools suggests a growing recognition that there is a need for greater investment in human capital as a necessary prerequisite to obtaining a more versatile and creative labor force. Muncie's economic problems are real, but so is its potential to solve them. ☐

Gary-Hammond-East Chicago (Calumet area)

Leslie P. Singer

Professor and Coordinator of Economics, Indiana University Northwest

In our previous forecast (*IBR*, Nov-Dec 1984), we indicated that the long decline in northwest Indiana manufacturing employment would come to an end. We predicted a flat growth curve for most employment categories. These were relatively painful predictions because, while it meant that the long downturn in manufacturing was ending, it also made it quite clear that northwest Indiana would not be participating in the national economic recovery, not even after a lag of three years.

Our predictions proved accurate, as indicated in **Table 1.** The decline in steel employment has been halted within the 38,000-40,000 employment range as our models have been predicting since the beginning of 1984. **Figure 1** gives a visual image of the forecast and the support level. The turnaround is encouraging, but the shallowness is disappointing.

The long delay in the local economy's recovery caused the lower turning point of the local short cycle to coincide with a phase of reduced growth in the national economy. Previously, steel output and steel-related local manufacturing products were responding to a national investment boom. U.S. fixed investment spiraled from a low of 177.8 billion constant 1972 dollars in the fourth quarter of 1982 to a high of 300.2 billion constant dollars in the third quarter of 1984. Steel and manufacturing in northwest Indiana were on the rebound. However, full participation in the investment boom was marred by inroads of imports that supplied much of the national demand for capital goods.

Table 1

Wage and Salaried Employment in Northwest Indiana Establishments
Adjusted Quarterly Rates
(Three-Month Moving Averages) in Thousands of Employees

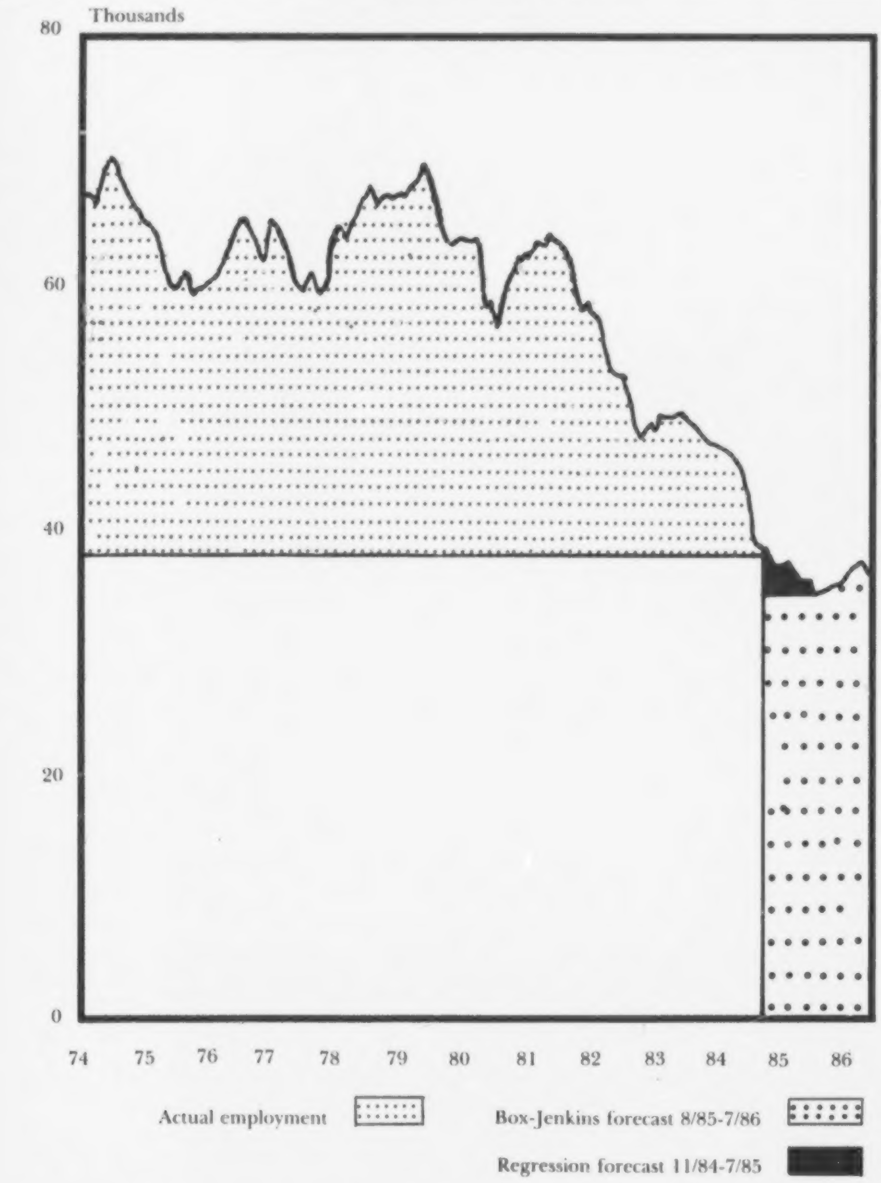
			Actual		
	1984	*1984*	*1984*	*1984*	*1985*
	1Q	*2Q*	*3Q*	*4Q*	*1Q*
Total employment	212.8	213.2	207.9	211.0(208.1)	210.6(207.4)
Mfg. employment	67.7	66.8	60.1	60.6(61.4)	60.8(60.9)
Steel employment	47.9	45.1	38.6	38.9(39.1)	39.2(39.1)
Steel-related mfg. employment	19.7	19.1	18.8	18.6	19.0
Nonmfg. employment	144.4	146.3	147.8	150.4(149.0)	149.8(148.5)
Nonmfg. industrial (const., util., pet.)	21.5	23.1	23.9	22.4	22.7
Private serv. indus. (incl. retail, insur., fin., banks)	95.4	93.6	94.0	98.3	97.4
Public sector (incl. education)	28.2	29.6	29.9	29.7(29.8)	29.7(29.6)

			Projected		
	1985	*1985*	*1985*	*1986*	*1986*
	2Q	*3Q*	*4Q*	*1Q*	*2Q*
Total employment	210.9(207.0)	212.3(207.4)	212.6(208.8)	213.3	214.5
Mfg. employment	61.1(60.8)	61.6(62.1)	61.2(61.9)	61.9	62.1
Steel employment	38.9(40.1)	37.8(40.0)	38.3(40.9)	39.1	38.8
Steel-related mfg. employment	19.7	21.2	20.8	20.2	19.9
Nonmfg. employment	149.8(148.9)	150.7(148.9)	151.4(148.9)	150.4	152.4
Nonmfg. industrial (const., util., pet.)	22.5	22.6	21.7	21.8	22.9
Private serv. indus. (incl. retail, insur., fin., banks)	99.0	99.3	100.6	99.6	99.4
Public sector (incl. education)	28.3(29.3)	28.8(29.2)	29.1(29.1)	30.0	30.1

The values in parentheses next to the actual data and the current revised projections for the fourth quarter of 1984 and the first to fourth quarters of 1985 are our 1984 predictions (see *Indiana Business Review*, Nov.-Dec. 1984, Table 1, p. 10).

Figure 1

Steel Employment, Actual and Projected, for Northwest Indiana Region



The first nine months are extrapolated by a regression containing more than 20 explanatory variables. The Box-Jenkins projections take the regression extrapolations as given data and subsequently forecast the following nine months.

Simultaneously, local steel plants were discarding labor-intensive processes, concentrating instead on a few high-speed steelmaking operations. This resulted in drastic labor force reductions.

In 1978 the Census of Manufactures reported a payroll for production workers in local primary metal manufacturing of 1.536 billion in current 1978 dollars. This is equivalent to 2.405 current 1985 dollars. As indicated in **Table 2,** the steel payroll was only 1.171 billion 1985 dollars in the first quarter of 1985.

More than 1 billion 1985 dollars were drained from northwest Indiana payrolls during the prolonged 1979-85 manufacturing downturn. Only a very small proportion of this loss of payroll income was offset by an increase in the nonmanufacturing payroll, which is beginning to show a gradual cyclical rise. The upturn is expected to continue for several more years.

More than 1 billion 1985 dollars were drained from northwest Indiana payrolls during the prolonged 1979-85 manufacturing downturn. Only a very small proportion of this loss of payroll income was offset by an increase in the nonmanufacturing payroll, which is beginning to show a gradual cyclical rise.

Nonmanufacturing is now clearly the mainstay of the local economy. The nonmanufacturing payroll of $2.4-2.5 billion (for nonsupervisory personnel alone) is now about 58% of the total local payroll, as compared to 40% in 1978.

What will continue to fuel the nonmanufacturing payroll if the share of the export sector is declining? Three major sources of income are likely:

(1) Income from liquid assets, including private insurance and pension funds;

(2) Federal, state, and local transfers;

(3) Exports of labor to the Chicago metropolitan area.

In 1978 the U.S. Department of Commerce estimated that Social Security, AFDC, V.I. and V.A. Medicare and Medicaid payments to local residents amounted to 547 million 1978 dollars. Income from private pensions and income from fixed and liquid

Table 2

Payroll of Northwest Indiana Production Workers in Manufacturing and of Nonsupervisory Employees in Nonmanufacturing (in Billions of Current Dollars)

	Actual				
	1984 1Q	*1984 2Q*	*1984 3Q*	*1984 4Q*	*1985 1Q*
Manufacturing pay	1.877	1.843	1.716	1.648	1.739
Steel mills	1.357	1.365	1.108	1.088	1.171
Nonmanufacturing pay	2.316	2.372	2.348	2.423	2.415
Total payroll	4.194	4.215	4.064	4.071	4.154
Annual % rate of change		2.033%	−14.8%	.688%	8.155%

	Projected				
	1985 2Q	*1985 3Q*	*1985 4Q*	*1986 1Q*	*1986 2Q*
Manufacturing pay	1.768	1.801	1.835	1.872	1.912
Steel mills	1.183	1.208	1.229	1.253	1.287
Nonmanufacturing pay	2.413	2.402	2.461	2.513	2.608
Total payroll	4.181	4.203	4.296	4.385	4.520
Annual % rate of change	2.596%	2.104%	8.85%	17.32%	12.31%

assets were 1.609 billion 1978 dollars. In 1985, we estimate that private and public transfers will exceed 1 billion current dollars.

Consequently, it is not surprising that, in spite of the shrinkage in the manufacturing sector of the local economy, shopping malls containing several hundred small retail outlets, professional offices, and service centers are being built and several more are planned. This expansion will occur along a growth semicircle or arc that begins south of Highway 6 in the western portion of Lake County, proceeds along Highway 30, and turns north to Highway 20 in Porter County.

Within a few years, this process will complete the isolation of the central urban areas that extend north of this growth semicircle. Most nonmanufacturing expansion, except for a few isolated islands, is likely to proceed along and south of the growth semicircle.

Owing to the fact that the transfer burden and the related tax and bonding burden will be concentrated for the most part in Lake County, much of the future small industry growth will tend to be located in Porter County and LaPorte County, which adjoins the MSA.

Steel, however, continues to be an important factor in local economic development. The relative weight of the steel and manufacturing payrolls in our forecasting equations for nonmanufacturing has dropped from .5813 in 1979 to .3372 in 1985. Nevertheless, a 34% impact continues to be an important economic driving force, particularly if the remaining 66% is spread over the 21 individual predictor series that are used to forecast the domestic nonmanufacturing sector. The manufacturing payroll continues to predict well the behavior of the domestic sector with a variable lead of 11 to 14 months.

The steel industry will have to recapture some of the specialized steel markets that they have lost to the minimills. Locally, Inland Steel is making progress in that direction by building its own minimills. First quarter 1985 value added in steel stood at 75.0 (1967 = 100). This was 1.2% above a year ago. April value added stood at 84.5 or 26.3% above one year ago.

Steel corporations have to diversify in order to shore up their faltering capital structure and their inadequate cash flow. Prospects for this happening are good.

Moreover, steel corporations have to diversify in order to shore up their faltering capital structure and their inadequate cash flow. Prospects for this happening are good. Thus the time may not be too distant when the northwest region will rejoin buoyant Indiana economy. ☐

Evansville

Maurice Tsai

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The Evansville economy showed moderate growth in 1984, and this momentum is expected to continue in 1985. In terms of the Evansville Area Business Index (see **Table**), the growth rate of the regional economy in 1984 was 2.1%. A growth rate of the same level is expected for 1985.

During the second half of 1984, the activity level was stationary except for December, when the monthly index showed an increase of 3.5% over November. The monthly indices of January and February 1985 were slightly below the same months in 1984, but they were above July to November of 1984. As we see now, the year of 1985 will be one of slow growth without recession. With a low inflation rate and lowered interest rates, the prospects of such continuous growth become more certain.

The leading role in local economic growth in 1985 will be played by manufacturing and trade. The manufacturing index is expected to increase by 2.6% and the trade and services index by 1.4%. Industrial production in the first quarter of this year trailed behind last year's level because of severe winter weather. In the remainder of 1985, this sector should perform better than it did last year. The electricity consumption by the manufacturing sector in February exceeded the January level. In the first two months of 1985 manufacturing employment rose but at a rate less than expected for the season. Normal spring activities should boost manufacturing employment as more workers are recalled.

The leading role in local economic growth in 1985 will be played by manufacturing and trade.

In the trade and services sectors, employment dipped slightly in the first quarter but was still higher than the 1984 level. The Easter season and the opening of four new stores increased the retail trade employment. The health service sector broke its downward trend; its employment rose by 100 due to seasonal demand and an increase in medical facilities. Sales of new automobiles and trucks in the first two months ran behind last year's record but are still high compared to the 1981-83 level.

The construction sector, which showed a slowdown in 1984, reversed its trend in 1985. The growth rate this year is expected to be about 4.2%. The main thrust comes from the Division Street Project and other public construction projects such as a hospital addition, a museum expansion, and a university library and medical care center. In February 1985, 800 more construction workers joined the sector. Further increases will come through summer and fall seasons. The weak residential construction sector was somewhat strengthened in the first two months, and this upward trend may continue as mortgage rates decline.

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The local employment situation has improved from the trough of 1983. The employment index registered 100.71 in 1983, increased to 103.76 in 1984, and is anticipated to rise to 106.00 in 1985. Beginning in 1985 the Evansville Metropolitan Statistical Area (MSA) includes four counties instead of five; Gibson County is no longer included in the area. The four-county area now has a 90% share of the employment of the 1984 Evansville SMSA (Standard Metropolitan Statistical Area). As of February 1985 it has a labor force of 134,700, with 122,400 employed and 12,300 unemployed. During 1984 the size of the labor force remained almost stable; employment increased 1,500 and unemployment declined 2,000. The unemployment rate, 10.2% in January 1984, dropped to 8.4% in December. The January 1985 rate was 8.5%. The rate rose to 9.7% in February,

Evansville Area Business Index
(1972 = 100)

		Industrial Production	*Trade & Services*	*Construction*	*Transportation*	*Finance*	*Employment*	*Composite Index*
Monthly index								
1984	July	112.25	104.43	104.78	93.43	104.95	102.88	106.30
	Aug.	111.21	106.57	97.99	96.87	107.67	103.97	106.53
	Sept.	110.05	107.36	99.41	95.16	107.05	104.25	106.19
	Oct.	112.31	106.20	99.49	96.28	105.30	105.29	106.93
	Nov.	113.29	104.90	100.42	95.30	107.39	105.71	106.99
	Dec.	117.21	110.45	103.81	95.50	107.27	107.13	110.73
1985	Jan.	115.65	109.00	96.86	100.20	102.40	105.40	108.95
	Feb.	115.19	107.20	97.04	97.23	103.07	104.35	107.87
Annual Index								
	1981	108.83	102.28	107.63	98.94	97.75	105.57	105.01
	1982	104.52	102.36	103.62	93.23	102.40	102.85	102.64
	1983	108.14	104.10	116.09	91.36	104.60	100.71	105.41
	1984	114.99	106.01	100.79	94.98	106.16	103.76	107.65
	1985 (proj.)	118.00	107.50	105.00	97.00	107.50	106.00	110.00

the result of 1,900 more people entering the labor force while employment dropped by 100. In other words, the influx of job seekers overwhelmed business, which was unable to create jobs quickly. The situation should be temporary as new and existing firms are given a longer period for adjustment. Some discouraged job seekers may choose to withdraw or move to other areas. As a result, the local unemployment rate eventually will come down.

Several factors favor future growth of the regional economy. *First,* various improvements in the transportation network are under way or in the final planning stage. The Division Street project, the building of I-164, the Lynch Road extension, and the widening of Morgan Avenue all should increase the traffic flow into or within the city. *Second,* the construction of a new airport terminal should increase the city's accessibility to other parts of the country, an improvement which is badly needed to attract new industries and firms. *Third,* the construction of a Zayre Corporation distribution center, to be completed by 1986, will increase local employment and income. *Fourth,* the new master plan for the central business district will improve the city's economic potential in the years to come.

With these developments, the Evansville economy should be in a good position to expand its economic base, thereby stimulating more regional growth in the future. ☐

Richmond

Ashton I. Veramallay

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Richmond is experiencing the effects of the national economic slowdown. Two plants, Richmond Gear and Walt Disney, will be closed by year's end. About 500 people will lose their jobs. This will add to the current double-digit unemployment rate. Some layoffs also have been taking place, and no immediate relief on the employment front can be expected within the next two quarters.

However, if Richmond is fortunate enough to attract a Japanese automobile plant in the near future, the high unemployment trend will be reversed. Were Mitsubishi to locate an automobile plant in Richmond, up to 2,000 jobs might be generated. Such a venture could enable the local economy to reach full employment, a goal which has been elusive during the last two decades. Otherwise Wayne County remains in a "no growth/slow growth" phase, still awaiting the Reaganomics prosperity.

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The retail sector is holding fairly stable. Consumer confidence is still relatively high. People are buying big-ticket items, including recreational equipment. Most people have received their federal income tax refunds, which average $500. These refunds give people extra purchasing power that is fueling retail trade. Local tourism also is contributing positively to the community. It brings in at least $3 million annually, and the Rose Festival plays a significant part in attracting tourist dollars. More than 60,000 out-of-town people are expected to come to the Festival's activities in June and July.

The Red Devils, runners-up in the state basketball tournament, have galvanized people, making them feel that Richmond at times can accomplish the impossible.

Community expectations are high for an economic upswing. The Red Devils, runners-up in the state basketball tournament, have galvanized people, making them feel that Richmond at times can accomplish the impossible. Similarly, the business sector anticipates, through aggressive marketing, an economic miracle that will pull the community out of the doldrums. ☐

Lafayette

William C. Dunkelberg

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Economic activity in the greater Lafayette area remained on a strong and steady path during the first half of 1985. Aside from a few disappointments, the overall performance has been very satisfactory. Although general retail sales seem to have flattened out in the past few months, there has been a lot of strength in the automobile sector. This may be siphoning some of the demand from other big-ticket items. The farm problem also may be contributing to a slowdown, with farmers reluctant to spend when crop prices are uncertain.

The overall employment picture is excellent (see **Table**). Total employment is up more than 2,000 from a year ago, with major contributions from the trade and government sectors. The manufacturing sector did not grow, with total employment remaining unchanged. Nationwide, however, manufacturing employment has declined, making Lafayette's performance a good one.

Lafayette Employment

Major Sectors	*May 1984*	*May 1985*
Construction	1,700	1,800
Manufacturing	11,300	11,300
Service	9,900	10,100
Trade	11,900	12,500
Government	18,700	19,800
Finance	2,600	2,700
Total	58,000	60,200

The outlook for employment growth is good. Agricultural processing remains very strong. Some manufacturing firms expect activity to remain at high but stable levels. Several major firms will begin operations or are expanding facilities, contributing both to construction activity now and to other types of employment later this year and early in 1986. Though one major firm has cut employment by several hundred, this will be offset by new firms in the manufacturing area that will hire several hundred workers.

Total employment is up more than 2,000 from a year ago, with major contributions from the trade and government sectors.

The growth in employment supports a pickup in final sales [retail sales] later this year. The influx of new business should prove helpful to a construction industry that to date has not done well in this recovery. Falling interest rates should provide some additional support to single-family home activity, although it is not clear how long the current lower rates will prevail.

The growth in employment supports a pickup in final sales [retail sales] later this year.

The prospects for the remainder of the year are very good, with fewer "downside" risks than "upside" events on the horizon. On balance, net employment growth should remain in the plus column. Only a major downturn in the national economy, with significant adverse impacts on the manufacturing sector, could undo what appears to be a prosperous 1985 for the Lafayette area. □

Jeffersonville—New Albany (Louisville area)

Fay Ross Greckel

Professor of Economics, Indiana University Southeast

The Louisville metropolitan area economy continued its gradual and somewhat uneven expansion during the past six months. A similar pattern is expected in the months ahead.

Employment has been rising, but it has yet to regain its prerecession totals. By the end of 1984, Clark and Floyd County employment was still nearly 2,000 jobs below the 1981 peak. Unlike many other geographic areas—including the Kentucky portion of this metropolitan area—Clark and Floyd's manufacturing employment at the end of 1984 was slightly higher than the 1979 level and nearly equal to the job level of 1981. Nonmanufacturing employment, however, still lagged considerably below the 1981 peak.

Analysis of the 1985 employment picture is somewhat more difficult, due to changes in the statistics being reported by state offices. Employment data are now being issued for the expanded seven-county MSA (metropolitan statistical area), instead of the old five-county area. Harrison County in southern Indiana and Shelby County, Kentucky, have been added to the five counties (Clark and Floyd in Indiana and Jefferson, Oldham, and Bullitt Counties in Kentucky) for which employment trends have been reported in the *IBR* over the past decade.

At present, statistics for the expanded MSA are available only for the years 1983 to 1985. This is not a sufficient history to permit comparisons between 1985 and prerecession conditions, nor is it a long enough time span to allow seasonal adjustment of monthly and quarterly data.

Table 1 presents the unadjusted employment and unemployment data for the three-county Indiana portion of the MSA, as well as for the seven-county metropolitan area as a whole. Inclusion of Harrison County raised the 1984 nonfarm employment total for the Indiana portion by about 5,800 jobs. Between the first quarter of 1984 and the first quarter of 1985, employment in the three Indiana counties increased by 1,800 jobs, a little less than the typical annual increase during the 1970s. The gains were spread fairly evenly throughout both the manufacturing and nonmanufacturing sectors, except for a slight decline in public hospital employment.

In 1984 the seven-county MSA employed 16,000 more workers than in 1983, a good increase by historical standards. However, most of the growth was in the first half of the year, with a slowdown occurring later in 1984. Indeed, from the first quarter of 1984 to the first quarter of 1985, MSA employment gained only 9,000 jobs. Manufacturing employment actually declined by 2,000 jobs during that period. Jobs were added throughout the nonmanufacturing sector, with the largest gains in wholesale and retail trade, services, and construction.

The Kentucky Department for Human Resources' estimates of unemployment show the seven-county unemployment rate declining steadily over the past five quarters, though it remained higher than the national unemployment rate. During the first four months of this year, the local unemployment rate averaged 8.35%, a full percentage point lower than for the same period of 1984. It is estimated that the number of unemployed MSA residents declined by about 4,500 persons between January and April of 1985.

Unfortunately, these estimates probably underestimate the extent of actual (as opposed to statistical) joblessness among area residents, because the seven-county labor force apparently also declined—by about 4,400 persons—between the first four months of 1984 and the same months of 1985. Ordinarily, the civilian labor force *increases* from year to year, as new entrants to the labor force considerably outnumber

Table 1

Louisville Area Employment and Unemployment in Thousands 1983-1985[1]

	Total Nonfarm Emplmnt.	*Mfg. Emplmnt.*	*Nonmfg. Emplmnt.*	*Number Unemployed*	*Unemplmnt. Rate*
Louisville Metropolitan Area[2]					
Annual Averages					
1983	380.0	85.4	295.4	49.1	10.7%
1984	396.7	89.2	307.6	39.7	8.6
Quarterly Averages					
1984:1	385.6	89.0	296.6	43.0	9.5
:2	396.4	88.8	307.1	40.1	8.7
:3	403.4	89.8	313.6	36.9	7.9
:4	401.6	89.1	312.5	38.7	8.3
1985:1	394.4	86.9	307.6	39.3	8.7
:April	402.2	86.7	315.5	33.0	7.3
Clark, Fioyd, and Harrison Counties					
Annual Averages					
1983	49.9	11.7	38.2	N/A	N/A
1984	51.4	13.0	38.4	N/A	N/A
Quarterly Averages					
1984:1	49.5	12.6	36.9	N/A	N/A
:2	51.9	12.5	38.7	N/A	N/A
:3	52.4	13.5	38.9	N/A	N/A
:4	52.6	13.4	39.2	N/A	N/A
1985:1	51.3	13.1	38.3	8.8	10.4
:April	52.7	13.3	39.4	6.8	7.8

1. The employment data refer to establishments located within the area cited; the unemployment data refer to residents of the area. Data are not seasonally adjusted.
2. Includes Clark, Floyd, and Harrison Counties in Indiana and Jefferson, Oldham, Bullitt, and Shelby Counties in Kentucky.

Sources: Indiana Employment Security Division; Kentucky Department for Human Resources.

the attritions that result from retirement, out-migration, and death. After a recession, there is also some departure of secondary workers who had sought employment temporarily to shore up family finances. At the same time there is usually an even greater influx of previously discouraged nonworkers who had stopped looking for employment and dropped out of the labor force when the job market collapsed. The fact that the metropolitan area labor force appears to be contracting rather than expanding suggests that a large pool of discouraged nonworkers remains in this community—no doubt a legacy of the sharp drop in blue-collar jobs over the past several years.

The persistence of this problem is underscored by the data that show a decline of more than 2,000 manufacturing jobs between the first four months of 1984 and the same period in 1985. Most of the decrease was in machinery production, with smaller job losses also reported in food and tobacco manufacturing. Other industries generally showed little change over the year, but small employment increases occurred in the wood products and chemicals industries. Statistics on energy use also suggest a general sluggishness in manufacturing. During the months of March, April, and May 1985, Louisville-area industries used 21.5% less gas and 1.3% less electricity than in the same months of 1984.

Statistics on energy use also suggest a general sluggishness in manufacturing. During the months of March, April, and May 1985, Louisville-area industries used 21.5% less gas and 1.3% less electricity than in the same months of 1984.

Another indication that a significant segment of the community is still not participating in the economic improvements enjoyed by the majority comes from Dare-To-Care, which provides families with emergency food supplies. Between January and April 1985, Dare-To-Care provided food for 28,800 persons, a 10% increase over the first four months of 1984. Many of the families served were requesting aid for the first time.

Nevertheless, many areas of the economy are expanding. Louisville's downtown redevelopment, for example, continues apace. The recent opening of Humana's elegant national headquarters building adds a new and unusual office tower to the downtown skyline. Two months earlier and five blocks to the south, the magnificently restored Brown Hotel opened, followed by the first part of the adjacent Theatre Square complex. Smaller revitalization projects are also underway, notably the refurbishing of some of the central business district's handsome 18th-century buildings and their conversion to modern offices or boutiques. A major construction project in suburban Jefferson County, the new $35 million airport facility, will soon complete its first phase with the July opening of the "landside" passenger terminal.

Residential construction continues at a

Table 2

Residential Building Permits Issued, 1981-1985*

Period Covered	*Jefferson County Kentucky*	*Clark County Indiana*	*Floyd County Indiana*
1981	1351	275	287
1982	1088	160	218
1983	2235	226	309
1984	2571	237	199
1983: Jan.-April	448	61	86
1984: Jan.-April	602	74	72
1985: Jan.-April	1406	85	126

* Number of residential units for which building permits were issued, including single-family dwellings, apartment units, and condominium units.
Source: Kentuckiana Regional Planning and Development Agency

strong pace, as shown in **Table 2.** During the first four months of 1985, Clark, Floyd, and Jefferson Counties issued building permits for nearly twice as many residential units as in the first four months of 1984. In fact, the January-April permits for 1985 exceeded those issued during the first four months of 1982, 1983, and 1984 combined. Most of the increase from 1984 to 1985 in both Jefferson and Floyd Counties was in permits for apartment and condominium units, rather than single-family dwellings.

Concentration on rental units and condominiums seems warranted by the current real estate market, which remains fairly strong but is not growing at present. Jefferson County realtors reported a larger dollar volume of sales in 1984 than in any previous year, but *dollar* sales in the first four months of 1985 were running behind last year's figures. The *number* of sales was slightly higher.

New car sales in Floyd, Clark, and Jefferson Counties were slightly higher in the first four months of 1985 than in the same months of 1984. Virtually all of the increase occurred in Floyd and Clark Counties, where 2,100 new cars were sold in the first four months of 1985, compared with 9,700 in Jefferson County. Dealerships in the three counties reported that sales of new pickup trucks increased by nearly 7% in the first four months of 1985.

Looking ahead, the local economy should grow at a moderate rate for the remainder of 1985. The lower interest rates will continue to buoy construction, as well as the auto and real estate markets. Meanwhile, moderate increases in personal income should stimulate the retail and service sectors. Because similar trends should occur across the nation, some local manufacturing firms will also benefit—enough, probably, to halt the manufacturing employment decline and produce some net job gains in that sector. ☐

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